APR. 22 1960

# PETROLEUM WEEK

A McGRAW-HILL PUBLICATION

Crude price cuts start second round ..... 15
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Price 50 Cents

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# HOW ENGINEERED ACIDIZING BY DOWELL HELPS OPERATORS INCREASE PROFITS

In area after area, operators are finding that engineered acidizing by Dowell can help them in more ways than ever before. Treatments can be tailored to accomplish many objectives because Dowell can offer the most complete line of acid addition agents and the widest range of techniques in the industry.

To get the most from acid treatments, Dowell engineers can use the "Acid Guide"* to design treatments and estimate probable results. They also can employ supplementary Dowell services such as Abrasijet* (abrasive-fluid jetting service) and Rockshock* (implosive formation-treating service) to prepare wells for more effective treatments.

Here are some results from a few recent Dowell acid treatments:

*A Lincoln County, Kentucky* operator got an 80 bopd producer in an area of 40 bopd wells.

*An Ellis County, Kansas* operator saved a new well and got a producer that swabbed 4 boph.

*A Natrona County, Wyoming* water flood operator almost tripled water production from a supply well. The increase was from 35,000 to 95,000 bwpd.

*A Lea County, New Mexico* operator used a $410 acid job to make a 100 bopd producer out of a well that had gone dead during workover.

In recent months the success ratio of engineered acidizing treatments by Dowell has been higher than ever before; treatments have been unusually profitable to operators. You, too, can take advantage of the added degree of skill and experience offered by the company that originated inhibited acidizing.

For prompt service or detailed information, *dial Dowell*. Dowell services and products are offered from more than 150 offices and stations in the United States, Canada, Venezuela and Argentina. Dowell, Tulsa 1, Oklahoma.

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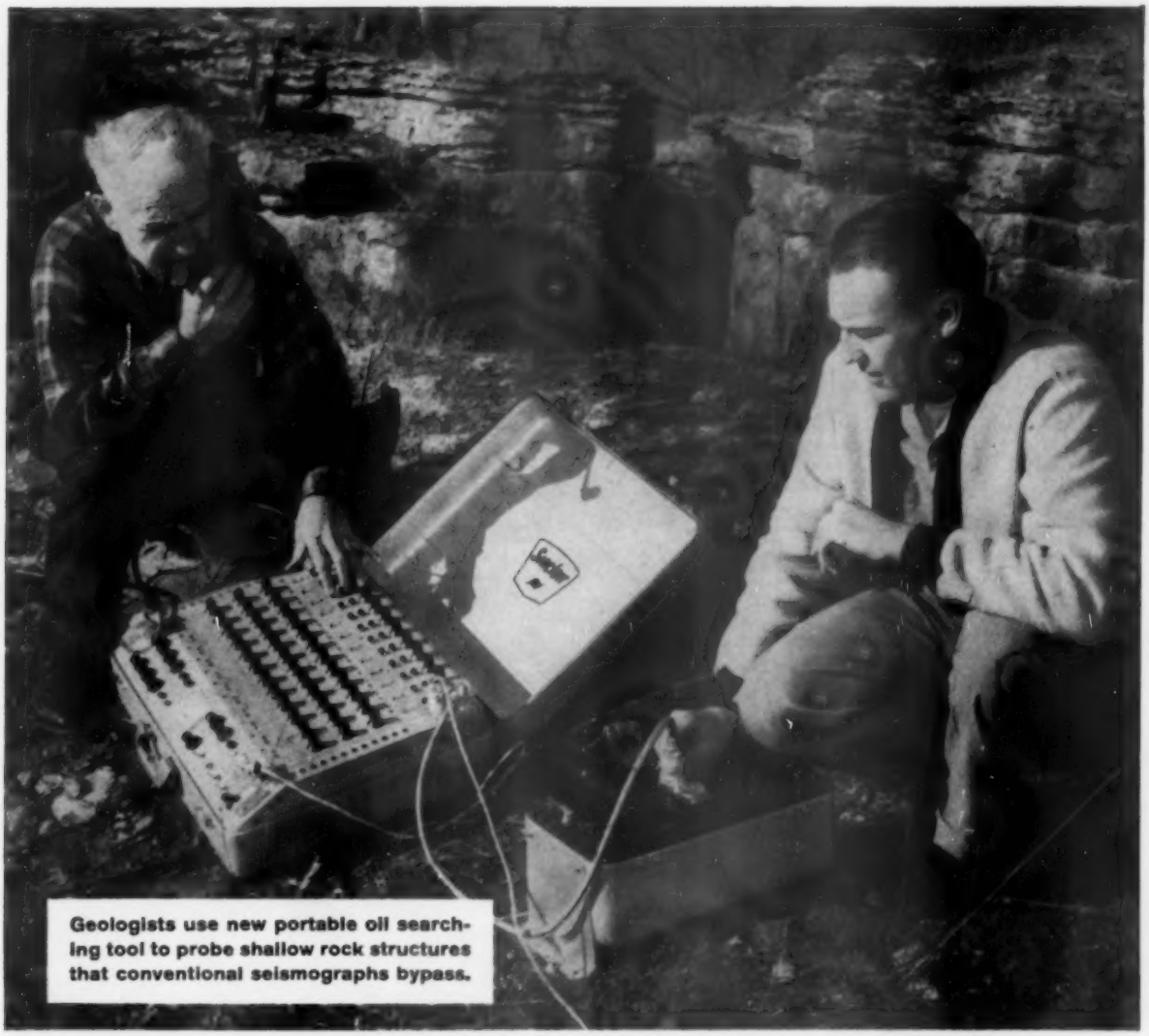

Geologists use new portable oil searching tool to probe shallow rock structures that conventional seismographs bypass.

# Meeting the Future Need for Oil

The biggest job America's oilmen face is finding economically all the petroleum energy this country will need in the "soaring sixties." Most economists expect *petroleum demand to rise 50 per cent by 1970.*

Sinclair is tackling the heart of the problem by expanding its research into more efficient means of finding and recovering oil and gas. It is seeking scientific break-throughs that will mean more barrels of oil found and recovered per dollar spent.

One experiment being tested is the unique, portable seismograph above. Developed by Sinclair Research Laboratories, Inc., this device quickly probes subsurface areas bypassed by conventional instruments.

Sinclair believes that from research will come better ways of obtaining the low-cost petroleum energy *on which this nation thrives—and depends.*

Send for informative free booklet "Energy for the Soaring Sixties"—yours for the asking.

Sinclair

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SINCLAIR OIL CORPORATION • 600 FIFTH AVENUE • NEW YORK 20, N. Y.

# ALLIS-CHALMERS

This maintenance man's toolbox sums up the story of

# the simplest process in petroleum:

**maintaining the products of Allis-Chalmers**
Even the standard products Allis-Chalmers builds for petroleum — for production, pipelining and refining — are designed for the industry's special requirements . . . and designed so routine inspection and maintenance are simply, quickly done.

And from no other manufacturer can you match the range of equipment available and benefit from Allis-Chalmers unit responsibility. Listed at right are some of the Allis-Chalmers products built to serve you economically throughout the plant—from crude to finished product.

*For service that matches the quality of the equipment, call the A-C representative near you. Or write* ***Allis-Chalmers,*** *Milwaukee 1, Wisconsin.*

**"Teamed" Equipment from A-C . . .** Electrical Generation and Distribution Equipment. Centrifugal and Rotary Vacuum Pumps. Motors. Motor-Generators. Motor Control. Blowers. Compressors. Water Conditioning. Earth Moving and Material Handling Equipment. A-1276

# PETROLEUM WEEK

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## INSIDE *Slant*

BIG GROWTH IN CANADA

The petroleum industry has enjoyed a phenomenal growth in Canada during the past ten years.

This fact was highlighted by W. Harold Rea, president of Canadian Oil Companies, Ltd., in a recent report to stockholders.

Figures show that demand in Canada increased 160%, from 319,000 b/d to 824,000 b/d.

During the same period, crude production in Canada increased by 780%, from 57,000 b/d to 503,000 b/d.

But even in the face of this growth, Canada faces the same problem that confronts the rest of the world—too much.

Canada's prospect of overcoming the abundance, appears to be much brighter than that of the U.S.

This assumption is based on the fact that the demand growth rate there is estimated at 6% to 8% annually.

This compares with an increase of 3.2% in U.S. demand last year, with the 1960 gain expected to be at virtually the same level.

Few industries enjoy a demand growth of the magnitude of the petroleum industry in Canada.

But this doesn't mean that Canadian producers can expect a sharp rise in production.

LeRoy Menzing
EDITOR

Congrats and $25 to J. A. LONG, Rua Uruguaiana 118 - 9° andar Rio de Janeiro, Brazil

Joe Roughneck, heart of the oil and gas industry, likes the convenience and economy of having Lone Star's ultra-modern pipe mill right in the middle of his workshop. Lone Star maintains the largest mill stock of API casing and tubing in the entire oil country. Delivery can be made overnight to 75 per cent of the active areas. Lone Star's recently enlarged plant is, more than ever, Joe Roughneck's solid source of supply.

**Neighbor, wherever you are, specify Lone Star and we both get a good deal.**

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DEPT/Opinions

# Views That

"If petroleum is to fulfill its destiny, the domestic industry will have to have more encouragement and support and less criticism and punitive legislation and regulation. Likewise, the petroleum industry itself will have to display the same determination, courage, and faith that it has throughout the past, and will have to avail itself of every possible economy in development and operation, every technological advance, and every improved conservation technique."

—WILLIAM J. MURRAY, JR.
*Commissioner*
*Texas Railroad Commission*

"A simple prescription for the industry's acute illness: Hold refinery runs under 8-million b/d through the second quarter; if a company is short on gasoline, buy in the open market instead of stepping up runs. If this is done, the last half of 1960 will be good."

—MASTON NIXON
*Chairman*
*Southern Minerals Corp.*
*Corpus Christi, Tex.*

"If man's 50,000 years of existence on earth could be compressed into the brief span of 50 years, it would be seen that everything which makes up our material world has been invented or discovered in just the past few days."

—MARK W. CRESAP, JR.
*President*
*Westinghouse Electric Corp.*

# . . . and Letters

Dear Sir:

I was fascinated by your article "Togetherness: Stimulant to Demand?" [PW—Feb.26'60,p48], which put over Harry Moir's approach to gasoline advertising this year. It coincides so closely with my own thinking on the subject—and that of our agents—that I felt I must write to you and let you see what one of Britain's major gasoline companies is doing this year.

With an unusually large series of advertisements in the national and Sunday press, we are trying to achieve this feeling of "togetherness" by showing that we understand the motorist's problems. We want to help him "turn mountains into molehills"; show him we understand what it is like "when town driving is a dog's life"; show him

# Make News . . .

we are not too old to remember his feelings "when the night is young."

Although there are many differences between motoring in this country and in the U.S., we are obviously thinking alike in believing that motoring can still be fun.

Incidentally, we are starting our campaign this year with two 60-second television commercials on the complete television network in this country. Both of these show young families journeying on their holiday—one to the seaside, the other on a boating trip to the lakes. An easy, relaxed jingle follows on the same theme as the general advertising, and the films have been designed both to hold the public interest and to sell by "charm"—in contrast to the impassioned blandishments of the soap companies.

PATRICK HARPER
*Advertising manager*
*National Benzole Co., Ltd.*
*London, England*

Dear Sir:

Re "Ford Wants New Oil Can Markings" [PW—Apr.8'60,p95]: I'd say it's about time the Lubrication Committee got on the ball and produced an honest means of identification for lubricating oils. Ford will have to get off their 4,000-mi. kick, also, and then possibly everyone concerned will understand which oil to use, etc. You see, even PW's staff writer doesn't understand the API lube oil classification, since he uses the words "Maximum Service" in reference to Service MS.

It appears the time has come for the lube oil makers to can a little more "quality" and throw out a lot more of the "romance" additive.

J. R. ANDERSON
*Columbus Oil Co.*
*Columbus, O.*

**• Service MS, according to API, represents the most severe service encountered in the operation of gasoline and other spark-ignition engines.**

PETROLEUM WEEK *will publish each week comments from readers on timely, pertinent subjects. Such expressions are welcome.*

*Address all such correspondence to LeRoy Menzing, Editor,* PETROLEUM WEEK, *330 W. 42nd St., New York 36, N.Y.*

GEM
OF THE
OIL AND GAS
INDUSTRY

Pipe at Lone Star Steel is made under ideal conditions by craftsmen as exacting as a jewel cutter.

Every facet of Lone Star pipe-making is subjected to repeated inspection to assure a flawless product. Lone Star API casing, tubing and line pipe . . quality protected from mining of ore to finished pipe . . is the hallmark of fine craftsmanship.

That's why Lone Star is called the gem of the oil and gas industry.

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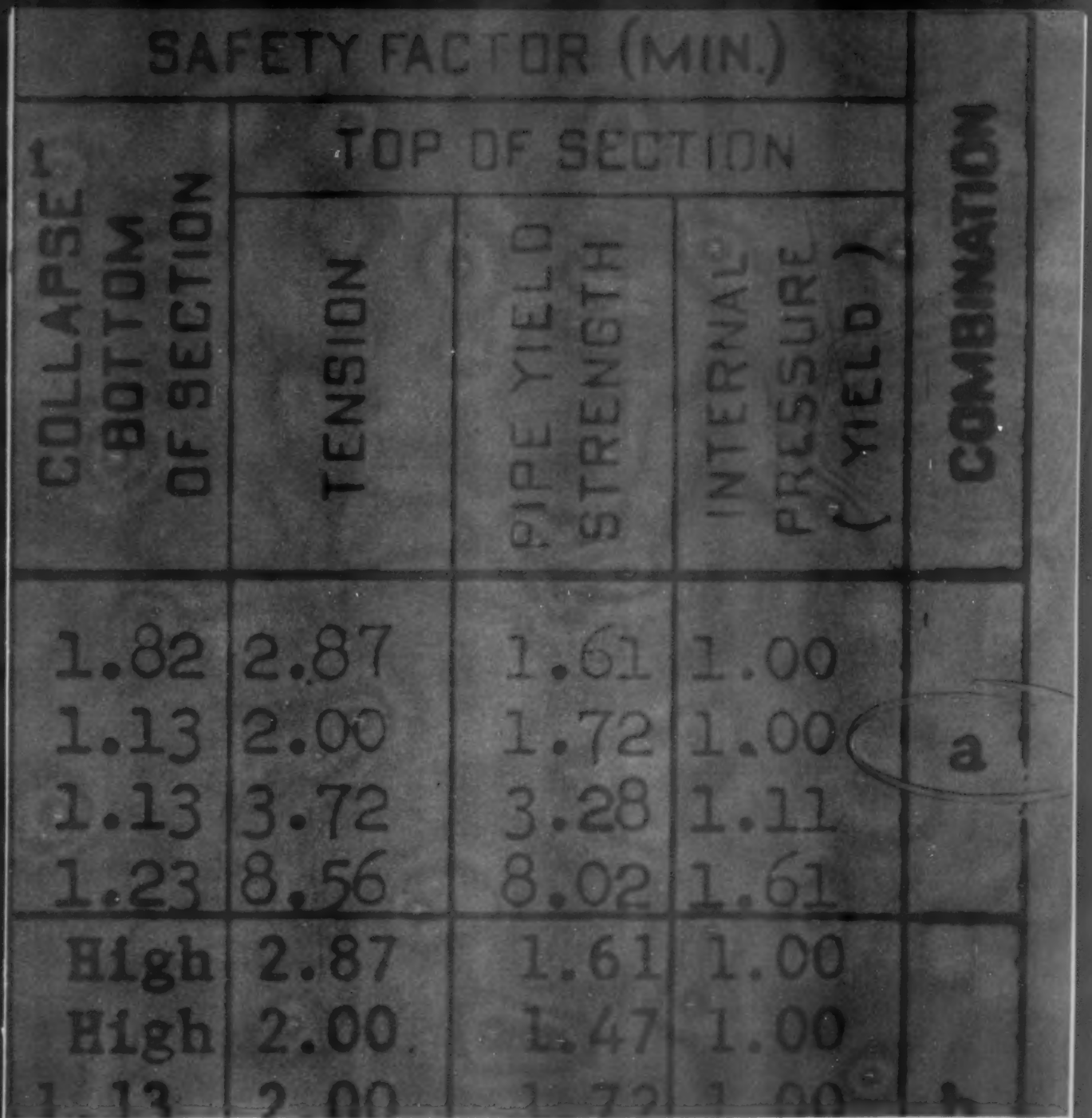
# The wizard of oil

*This National Tube field engineer is a modern-day Merlin, because he designs more economical and more efficient casing combinations.*

He does it without magic or sleight-of-hand, but with years of field experience and technical knowledge. He figures several casing combinations with razor-sharp accuracy, lists them on a form, and submits it to a customer. The customer then picks the combination that best fits his program—in this case it was combination "a."

Our field expert carefully explores the customer's operating methods. Does he run his string fast or slow? Type of equipment? Drilling technique? Location? If it's an offshore



| SAFETY FACTOR (MIN.) | | | | |
|---|---|---|---|---|
| COLLAPSE† BOTTOM OF SECTION | TOP OF SECTION | | | COMBINATION |
| | TENSION | PIPE YIELD STRENGTH | INTERNAL PRESSURE (YIELD) | |
| 1.82 | 2.87 | 1.61 | 1.00 | |
| 1.13 | 2.00 | 1.72 | 1.00 | a |
| 1.13 | 3.72 | 3.28 | 1.11 | |
| 1.23 | 8.56 | 8.02 | 1.61 | |
| High | 2.87 | 1.61 | 1.00 | |
| High | 2.00 | 1.47 | 1.00 | |
| 1.13 | 2.00 | 1.72 | 1.00 | b |

project, he'll include an extra safety factor. This engineer's strict attention to detail results in a casing combination that promises efficient, economical and satisfactory service.

A great many customers have benefited from our experience. You can too. National Tube is the world's largest and most experienced manufacturer of tubular products. Write National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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**National Tube Division of United States Steel**

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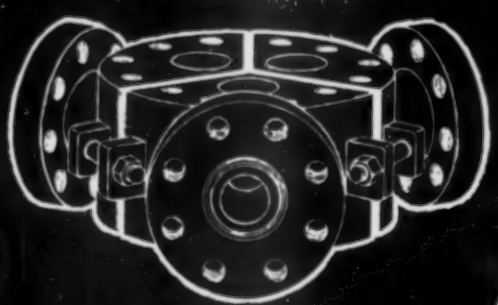
# The Ultimate in Flexibility for Triple Completions



TRI FLANGED TEE

## THE O·C·T TRI FLANGED TREE

There is *no* doubt about the payout when three good zones can be flowed through one wellhead. There *is* doubt when you use a jumble of complicated equipment.

The O-C-T Crescent Flange Tree is tailored for dual completions. And now we are proud to present the "Tri Flanged Tree" tailored for triple completions.

Like the Crescent, the "Tri Flanged Tree" offers the ultimate in *flexibility, simplicity* and *economy*. One valve in this triple hookup can be removed without disturbing the remaining two valves. Or, if necessary, any two valves can be removed without disturbing the third.

If there is a multiple producer on your horizon, talk to the O-C-T representative nearest you. He can solve your equipment problems before the problems arrive.

*where progress is a daily practice.*

**O·C·T**

**OIL CENTER TOOL CO.**

SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

Address Export Inquiries for All Countries to
P. O. Box 3091, Houston, Texas.

# 60-Second Summary / WHAT'S HAPPENING IN OIL

April 22, 1960

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**The second round of U.S. crude price cuts in the past three years appears to be under way.** And a trend away from the uniform posted price system has emerged. . . . p. 15

•

**The '60s promise to bring some drastic changes in oil-finding methods.** Increased emphasis on basic research is one reason why, according to a Petroleum Week Special Report. . . . p. 40

•

**The world's first quintuple producer has been completed by Sinclair Oil & Gas Co.** The gas well, 40 mi. off the Louisiana coast, tested 492-million cf/d on open flow from five zones. . . . p. 30

•

**American Oil Co. will start work soon on the world's largest crude still.** The unit, at the company's Texas City (Tex.) plant, will handle 150,000 b/d. . . . p. 64

•

**The marketing profits study that NOJC wants isn't going to be undertaken by API.** The request has been turned down, but NOJC's president, E. K. Bennett, isn't unhappy. . . . p. 17

•

**Scientists are still trying to find the right lubes for space travel.** So far, they've only had limited successes in the vast amount of research completed. . . . p. 66

•

**Oil replacement costs have climbed 30% since 1957 in the Rockies.** Despite the 52¢ per bbl. hike, the price of crude is still above its replacement cost. . . . p. 25

•

**Flexible offtake rates are a unique feature of a new unit operating agreement in Venezuela.** The four-company pact provides for initial production of over 200,000 b/d. . . . p. 68

•

**Payment terms were as competitive as prices on some crude supply bids in Montevideo last week.** The Uruguayan oil agency was looking for two cargoes of Kuwait-type crude. . . . p. 80

•

**A fifth court attack on the oil imports program jeopardizes its whole structure.** The latest, by Gulf Oil Corp., is directed against residual import allocations. . . . p. 16

•

**A pipelines' school in Baytown, Tex., is scoring high with oilmen.** Training at the School of Pipe Line Technology puts emphasis on the practical. . . . p. 74

•

**Public opposition is killing plans for a $5-million terminal on Long Island,** even though existing facilities are overburdened. . . . p. 82

# Up to the Minute / SIGNIFICANT LATE NEWS

April 22, 1960

**The Texas Railroad Commission cut the May allowable this week to eight days, down one from April.** It set a total allowable of 2,574,894 b/d, a reduction of 229,195 b/d. This was the third consecutive cut for Texas production, and the first eight-day schedule since June, 1958.

Texas producing days now add up to 47 for the first five months of this year, compared with 58 days for last year.

Five companies proposed a nine-day allowable for May at this week's meeting, with the balance suggesting eight or seven days.

**An allowable cut also hit Oklahoma producers.** The Oklahoma Corporation Commission, at midweek, reduced the minimum allowable from 18 b/d to 15 b/d. The allowable was set at an estimated 507,000 b/d, down 20,000 b/d from April, and the lowest in more than four years.

•

**A general strike halted everything in Venezuela at midweek, including all oil operations.** Venezuela's crude output in March averaged 2,765,700 b/d. Within hours after the strike was called by the General Confederation of Labor, the Venezuelan Oilworkers Federation ordered its members to participate, and to set up roadblocks and barricades. The rebellion of an army garrison at San Cristobal precipitated a labor strike call to support the government.

•

**William R. Connole will not get a second term on the Federal Power Commission.** Harold Baynton, a Nevada Democrat and counsel for the Senate Interstate and Foreign Commerce Committee, is the likely successor. A further shakeup of FPC may be in the offing also, depending considerably upon what turns up in the hearings to be started May 2 by a House subcommittee headed by Rep. Oren Harris (D., Ark.).

•

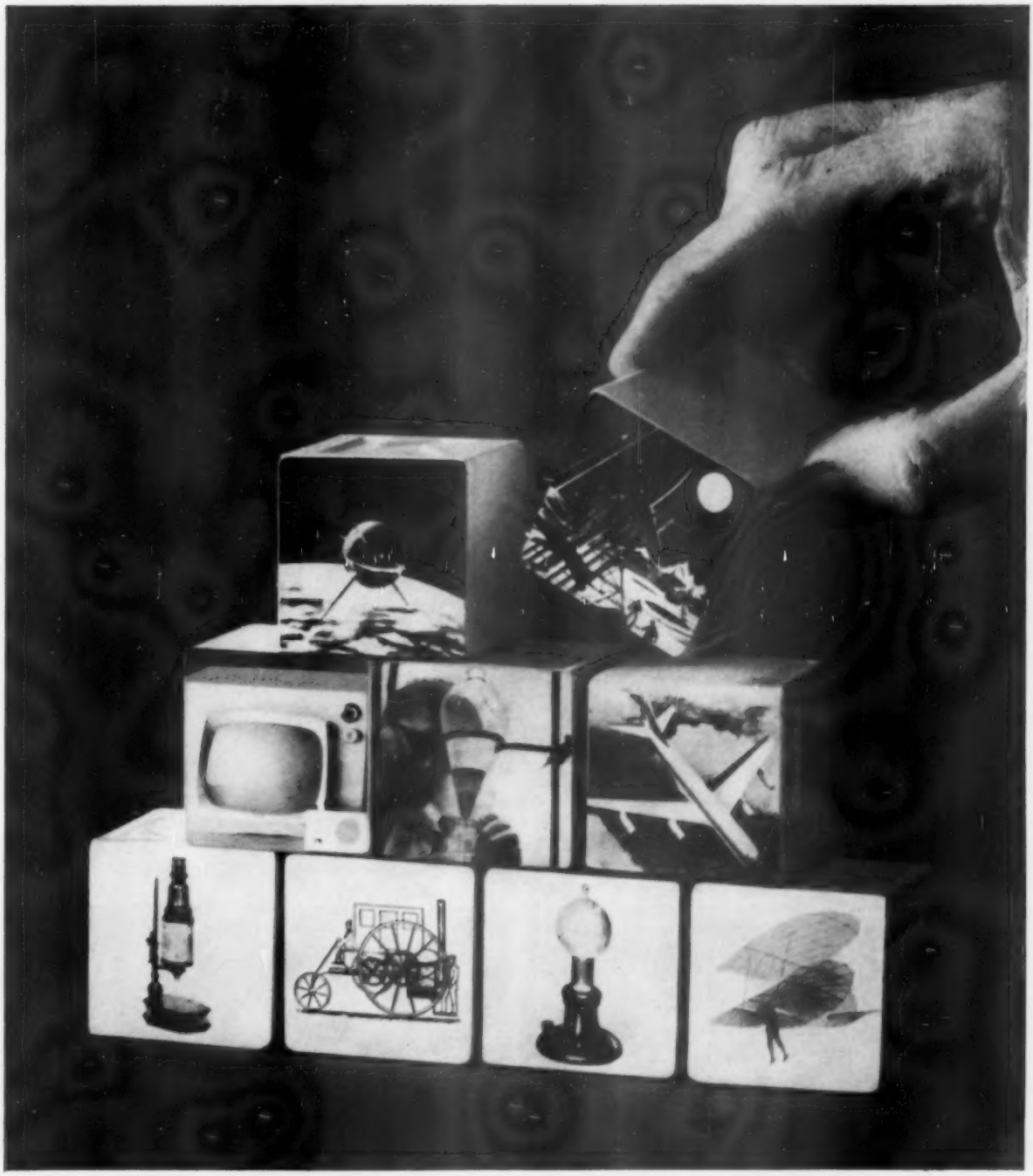
**Refiners apparently will have to foot the bill for an ambitious oil heat research and development program.** API's Fuel Oil Committee received 49 recommendations this week from Battelle Memorial Institute, but details were restricted until mid-May. Spokesmen indicated, however, that "refiners will have to come up with the money if we are to move ahead."

•

**The Federal Power Commission refused this week to hold more hearings in the Aneth Field natural gas case.** The commission stood pat on its Feb. 23 decision cutting the initial price from 20¢ per Mcf. to 17.7¢ per Mcf.

•

**Georgia received three bids for offshore lands this week but deferred action for several weeks.** Pure Oil offered a $50,000 cash bonus for 238,120 acres on a 10-year lease; Hunt Oil offered a $25,150 bonus for 500,000 acres, and specified it would drill 10 wells, the first to be started within a year; and Roderick A. Stamey asked for 28,000 acres but proposed no bonus.



"It is important to note that the unfolding possibilities of science and technology are likely to be realized at an even greater pace in the future. For discovery and invention feed on themselves. With every new discovery and invention we broaden the base upon which others are built."

— M. J. Rathbone, President

ESSO

**Standard Oil Company (New Jersey)**

# Have you met Ethyl's Fred Ramin?

CHANCES are you have . . . if your work is concerned with gasoline quality. At present, Fred is Manager of Ethyl's Gasoline Testing Laboratory in Yonkers, New York. Before that, he was chemist and assistant manager at the Tulsa lab. And even earlier, he was employed as an analytical chemist by one oil company and as chief chemist by another. He has a grand total of twenty-three years of experience in the oil industry.

This experience, plus Fred's education (at Rice Institute and the University of Tulsa) and his over-all knowledge of refinery operation, makes him a useful man to Ethyl's customers.

Like the Managers of Ethyl's other Gasoline Testing Laboratories, Ramin plays an important role in Ethyl's over-all program of providing quality control service to refiners and helping their laboratories with the blending and testing of gasoline. Yet, busy as this keeps him, he finds time to be extremely active in the ASTM, having served as Chairman of the ASTM—RD-1 New York Regional Group several times.

**Gasoline testing is another service to oil companies . . . typifying Ethyl's belief that service is just as important as product.**

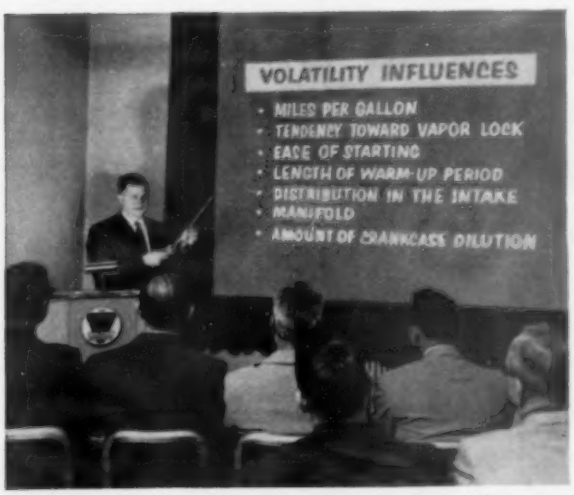
**ETHYL CORPORATION,** NEW YORK 17, N.Y. • TULSA • CHICAGO • LOS ANGELES

**ETHYL CORPORATION OF CANADA LIMITED,** TORONTO • **ETHYL USA (EXPORT)** NEW YORK 17, N.Y.

**2. Fred and technical people** of a customer's laboratory discuss the hydrocarbon content of a group of gasolines as determined by the fluorescent indicator absorption (FIA) equipment in the background. Ethyl's formula for calculating Road octane number uses percentage of olefins as one of its factors.

**3. Refiners** who plan to install new gasoline testing equipment or improve existing facilities often call on Fred for advice on lab layout. His experience with such installations enables him to suggest placement of engines and other equipment that often adds considerably to operating efficiency.

**1. Periodic visits** are made by Ramin to refinery laboratories to review improvements or changes in knock-testing procedures and equipment. Often, he is able to suggest modifications which can lead to greater efficiency and operating economy.


VOLATILITY INFLUENCES
• MILES PER GALLON
• TENDENCY TOWARD VAPOR LOCK
• EASE OF STARTING
• LENGTH OF WARM-UP PERIOD
• DISTRIBUTION IN THE INTAKE
• MANIFOLD
• AMOUNT OF CRANKCASE DILUTION

**4. The more information a salesman has** on his product, the better selling job he can do. That's why Ethyl arranges lab visits for customers' salesmen to supplement the oil company's own training activities. Here Fred explains the many types of gasoline tests and their significance. A lab tour follows, so the men can see the tests at first hand.

**5. Ramin and the technical supervisors** of a customer's laboratory go over the latest supplements to Ethyl's *CFR Engine Knock Testing* book. This loose-leaf manual, a basic guide in gasoline testing, is used throughout the world. Keeping it up to date at all times is one of the many valuable exclusive services Ethyl offers its customers.

YOU, TOO, CAN GET...

# DEHYDRATION

AT A **PROFIT** WITH

## BS&B DRY FRAC*

## 2, 3 or 4-TOWER

BS&B DRY FRAC
- ...is PROFITABLE
- ...is DEPENDABLE
- ...is COMPACT
- ...is COMPLETELY AUTOMATIC
- ...is SAFE
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# Has Second Round of Cuts Begun?

**The U.S. has had a general crude price cut during the past three years without apparently recognizing it, and now appears to be on the verge of a second round.**

The second round apparently was kicked off last week by Sinclair Crude Oil Co., when it reduced its posting for crude in East Texas, Southwest Texas heavy type, and Rocky Mountain sweet.

**What turned out to be the first round of price cuts started soon after the general increase of January, 1957.** Soon after that increase, the various oil purchasing firms began to whittle prices on an area basis. And the process has continued since, virtually hitting every section in the U.S. (table). The only exceptions have been for specialty crudes.

All types of crude in every area have not been hit by all purchasers, but the net effect of those who adjusted their prices has been to give the nation a general reduction.

The area-by-area method of reducing prices has been more severe than may appear on the surface.

This has been true of high-gravity crudes, those generally above 40-gravity. Most purchasers have placed a penalty on such crudes for each degree of gravity above 40.

The reductions also have been made more severe on those below 40-gravity through changes in the price differentials for each degree of gravity downward in some areas. Where the reduction formerly was two cents for each degree of gravity downward, some purchasers have increased this differential to three and four cents.

**Out of the first round of cuts has emerged a trend away from the uniform posted price system, considered somewhat "sacred" in the crude-buying business since the 1920s.**

There now exists a crazy-quilt or hodge-podge method, with two or more different postings in many areas.

No better example is the East Texas field, where four different prices now are posted. The increase of January, 1957, raised the top posting there to $3.25 per bbl. However, in July, 1959, Atlantic Refining Co. slashed its price by 20¢ per bbl. to $3.05.

Effective Apr. 1, 1960, Premier Oil Refining Co. reduced its East Texas posting by 15¢ per bbl. to $3.10. And last week there was the Sinclair reduction of 10¢ per bbl. to $3.15.

**Oversupply has enabled purchasers to gradually scuttle the uniform posted price in a given field.**

The reason they have been able to do so is simple: Virtually every purchaser has more than ample supplies of crude and they are not in the market for new connections.

In the days of normal or tight supply, producers had insurance against such cuts through the shifting of connections. However, there was some relief for the producers in North Texas, where American Petrofina Co. of Texas reduced its posting by 19¢ per bbl. effective Apr. 9.

Continental Oil Co. agreed to purchase 3,000 b/d of the 5,400 b/d affected by the Petrofina cut.

**The second round of reductions isn't expected to vary from the procedures followed by crude buyers in the first.**

There will be no general reduction in prices, but there will be more small price cuts here and there.

**The low product price is the basic reason given by the majority for the first round cuts, particularly those this year.**

And it is interesting that virtually all of the companies that have reduced prices in the past couple of months, or since the first of the year (table, page 16), have been net purchasers of crude.

In fact P. C. Spencer, chairman of Sinclair, pointed out in announcing his firm's price cut that it buys close to two-thirds of the crude processed at its refineries. This means that Sinclair buys approximately 300,000 b/d.

However, only one-fifth of this amount is involved in its reductions. The East Texas cut involved 20,000 b/d, with 32,000 b/d affected in the Rocky Mountains and 9,000 b/d in Southwest Texas.

Spencer also pointed out that "crude prices are already too low considering the cost of finding and producing crude," and stated:

"Obviously we cannot continue to pay prices for the crude that are not justified by competitive necessity."

**But the producer feels the current product price squeeze is the fault of the refiner through excessive runs.**

The high refinery operating rate, in the opinion of the majority, resulted in the too-heavy product inventory which has caused product prices to be trimmed.

But there is much doubt that even if the industry should reach what it considers to be adequate stock levels there would be a material price recovery in the immediate future.

**The producer also is beginning to wonder if the traffic in quotas per-**

## Crude Price Comparisons

(by leading oil states, areas, and key types,* for 1957 and 1960)

| Area | 1957 | 1960 |
|---|---|---|
| Arkansas | $3.10-3.25 | $2.90-3.00 |
| California | 2.54-3.70 | 1.47-3.37 |
| Colorado | 3.08-3.15 | 2.93-3.05 |
| Kansas | 3.15 | 2.98-3.05 |
| La. Coast | 3.40 | 2.95 |
| La., North | 3.10-3.15 | 3.00-3.10 |
| La., South | 3.35-3.45 | 3.10-3.30 |
| Mississippi | 3.08-3.40 | 2.58-3.30 |
| Montana | 2.95-3.15 | 2.48-3.15 |
| Nebraska | 3.08 | 2.93-2.98 |
| N. M. Inter. | 3.08 | 3.01 |
| N. M. sour | 3.02 | 2.87-2.95 |
| Four Corners | 3.15 | 2.75 |
| North Dakota | 3.15 | 2.55-2.95 |
| Okla. Sweet | 3.15 | 3.05 |
| Okla. sour | 3.05 | 2.95 |
| East Texas | 3.25 | 3.05-3.25 |
| **Gulf Coast—** | | |
| Goose Creek | 3.78 | 3.68 |
| Hastings | 3.68 | 3.68 |
| Anahuac | 3.50 | 3.40 |
| Low Cold Test | 3.78 | 3.78 |
| **Southwest Texas—** | | |
| Sweden | 3.55 | 3.20-3.25 |
| Mirando | 3.80 | 3.55 |
| Refugio Light | 3.65 | 3.25-3.35 |
| Refugio Heavy | 3.80 | 3.50-3.65 |
| N. C. Texas | 3.15 | 2.82-3.01 |
| Panhandle | 3.02-3.15 | 2.95-3.01 |
| West Central | 3.08 | 2.91-3.01 |
| W. Texas Sweet | 3.08-3.15 | 3.08 |
| W. T. Inter. | 3.08 | 3.01 |
| W. T. sour | 3.02 | 2.87-2.95 |
| Wyoming | 2.95-3.15 | 2.82-2.98 |

*Prices given are for highest gravity in each type.

**mitted under the mandatory imports control plan hasn't spoiled some refiners.** Refiners have been able to trade quotas for an average price advantage of $1 per barrel, which they apparently plan to retain.

Harry C. Jones, president of the Texas Independent Producers & Royalty Owners Assn., cited the quota advantage in wires to heads of Premier and Petrofina.

It was his opinion that the granting of quotas to inland refineries "should tend to equalize your competitive position and enable you to pay prices fair to producers and royalty owners.

"Gains made by the program may be lost quickly if cut-throat pricing results. Additionally, it would be unreasonable to assume continued support for this arrangement when price cuts are being initiated by refiners with no foreign holdings but which enjoy the benefits of import quotas."

And Alvin C. Hope, president of the Independent Petroleum Assn. of America, said the price cut by Sinclair "further aggravates an already unstable price situation and is in direct contradiction to the existing trend of increasing finding and developing costs.

". . . These conditions reflect a continuation of the depressed position the domestic oil-producing industry has suffered the past several years, which the establishment of the mandatory oil import program was expected to alleviate."

# Controls Face Fifth Test

**The fifth court attack on the oil imports program, this one by Gulf Oil Corp., and the first by a major company, poses a critical threat to the whole system of controls.**

Gulf's president, W. K. Whiteford contends the company is not attacking the presidential proclamation requiring limits on oil imports, or the maximum level of imports.

The latest suit is directed only against residual import allocations and, says Whiteford, "we are only seeking a fair distribution among eligible importers so that we may satisfy our contractural obligations."

But several members of Congress, notably Sen. Joseph O'Mahoney (D. Wyo), long have argued that the whole program is vulnerable because of its fragile base in the reciprocal trade agreements act.

Thus, some sources feel that the Gulf suit, even though it challenges only one part of the program, might jeopardize the full system if it gets the judicial decisions.

**Gulf's complaint basically is against the government method of allocating residual oil.**

The Pittsburgh firm presently has a Dist. I-IV allocation of 2,892 b/d for resid—adjusted earlier this month from the company's original six-month allocation of 2,504 b/d.

The suit filed in U.S. District Court in Washington complains that Gulf had 8.9¢ of the total residual sales in 1957 (excluding sales to other importers) but had been granted only 0.6% of the total of authorized residual imports.

"The method of allocating residual fuel oil imports . . . has the effect of freezing all importers to their respective proportions of the total fuel oil imports in 1957, without regard for changed circumstances," the company charges.

The suit also contends that the allocation system has "unfairly" allowed two companies—out of 35 importers—to get about 46% of the authorized residual imports.

**The government is scheduled to answer Gulf's charges shortly.**

Technically one answer was due this week, but the filing time was delayed until early next month. Douglas B. MacGuineas, Justice Dept. lawyer handling the case, expects the hearing to be held about mid-May.

It is assumed that Gulf's legal arguments will be similar to the appeals that it made to the Oil Imports Appeals Board, namely, that the way the pie is sliced is discriminatory and relatively inflexible.

Gulf's third appeal is still hanging with the appeals board, and the indications were that the court suit was initiated in anticipation of another turndown.

The latest appeal was filed two months ago, and requested a residual allocation of 35,000 b/d. The company based its appeal on extensive investments and operations in Venezuela since 1957, the year used by the government as a base period for deciding residual allocations.

**Of the four other challenges to the imports law, none has been successful—so far.**

Federal Judge Joseph Ingraham, of the Houston District Court, dismissed actions brought by Eastern States Petroleum & Chemical Corp. and Texas American Asphalt Co. last year.

A West Coast importer, U.S. Oil & Refining Co., won a temporary injunction and, for a time, imported unfinished oil in excess of the permitted ratio. But the injunction was dissolved automatically when the appeals board ruled on the problem and denied the appeal.

The fourth case involves Thurman Pava, who operates four service stations in Boston, and does business as the Car Care System. His suit attacks the constitutionality of the entire imports program, and is still pending.

## Crude Price Changes So Far in 1960

| Date | Company | Area | Change | Volume (b/d) |
|---|---|---|---|---|
| Jan. 1 | Union Oil | Four Corners | +15¢ | 3,000 |
| Jan. 1 | Republic | Southwest Texas | —10¢ | 3,500 |
| Jan. 1 | Sohio | Bayou Bouillon (La.) | —10¢ | ..... |
| Jan. 5 | Sinclair | Southwest Texas | —15¢ | 14,000 |
| Jan. 11 | Joseph Seep | Penn Grade | +15¢ | 30,000 |
| Jan. 11 | Suntide | Southwest Texas | —10¢ | 4,000 |
| Feb. 1 | Shell | Williston Basin | —15¢ | 30,000 |
| Feb. 15 | Coffield & Guthrie | Caldwell County (Tex.) | — 4¢ | 2,500 |
| March 21 | Esso Standard | Soso (Miss.) | —10¢ | 3,100 |
| March 22 | Suntide | Southwest Texas | —10¢ | 2,300 |
| March 22 | Suntide | Refugio Heavy | —15¢ | 7,800 |
| March 24 | Southern Minerals | Southwest Texas | — 5¢ | 27,000 |
| March 24 | Southern Minerals | SW Tex. Low-Gravity | —15¢ | 3,000 |
| March 25 | Republic | San Patricio County (Tex.) heavy crude | —15¢ | 3,500 |
| March 26 | Arkansas Fuel | 3 Arkansas pools | —10¢ | 2,700 |
| April 1 | El Paso Natural | San Juan Basin | +10¢ | 3,000 |
| April 1 | Sohio | Arkansas | —10¢ | 1,000 |
| April 1 | Premier | W. Central Tex. | —10¢ | 10,000 |
| April 1 | Premier | East Texas | —10¢ | 4,300 |
| April 1 | Republic | Southwest Tex. Light | — 5¢ | 12,000 |
| April 9 | American Petrofina | North Texas | —19¢ | 5,400 |
| April 13 | Sinclair | East Texas | —15¢ | 20,000 |
| April 13 | Sinclair | Southwest Texas | —10¢ | 9,000 |
| April 13 | Sinclair | Rocky Mountain Sweet | — 5¢ | 32,000 |

# Lube Outlook Is Good, NPA Hears

**The 1960 lube oil outlook, as pictured for the National Petroleum Assn. this week, can be summed up briefly: Good, but not as good as last year.**

J. A. Coble, manager of the Mobil Oil division of Socony Mobil Oil Co.'s economics department, told the meeting that total demand, including exports, would move up 2.3% to 159,000 b/d this year, compared with last year's 8% hike.

**The sharp rise in exports that helped spark last year's demand will just about hold steady in 1960.**

The strength shown in exports last year, Coble said, was a "big, pleasant surprise."

Exports increased 8% to about 38,000 b/d, "whereas we had looked for a gain of 4%," he said. "No gains," he added, are estimated for exports in 1960.

**Brightest spot in the lube picture is on the West Coast, where demand is slated to climb 7%, compared with a total domestic average of 3%.**

Coble said this was the result of a relatively higher forecast for industrial activity and gasoline consumption.

"The largest consuming areas on the Eastern Seaboard and the Middle West," he added, "can expect little better than a 2% growth."

Total domestic demand, he pointed out, is slated to climb from about 117,000 b/d in 1959 to around 120,000 b/d in 1960.

**Industrial lubes, which posted an 11½% increase in demand last year, are slated to lead the way again in 1960.**

"Breaking the forecast down," Coble said, "we see the market for automotive and aviation lubricants increasing by 1.6% in 1960. It looks as if industrial lubricants will show a gain of 4%.

Motor fuel consumption last year climbed about 3%, and motor oil demand gained 1.7%.

**The lube oil industry will still have excess producing capacity this year —something like 24,000 b/d to 25,000 b/d.**

Coble said that although lube manufacturers have "not been as guilty as others in chasing the incremental barrel, the fact remains that we still have excess production capacity hanging over our heads."

In 1959, he said, unused capacity dropped sharply to an average of 28,000 b/d, or 16% of total capacity. For 1960, he added, indications are that production will be slightly higher than demand. Since estimated production capacity is almost 184,000 b/d, he said, the unused capacity should average around 13%—or about 24,000 b/d to 25,000 b/d.

**At the same meeting, Charles E. Spahr, president of Ohio Standard, campaigned for "healthier" government-industry relations.**

"This doesn't mean changing government's attitude alone," Spahr said. "We in the petroleum industry must consider our own attitudes. We must avoid being on the defensive, avoid being apologetic for our industry."

He urged adoption of a positive and cooperative approach rather than one of defeat and belligerence.

**"At present," Spahr said, "the government's relations with business are characterized by inconsistency and contradiction."**

Spahr called for a "restatement by our government of the kind of competitive atmosphere that is to be promoted. When this is provided, it would be thoroughly policed at upper levels of administration, in order that future policy-making decisions are not abandoned to overly enthusiastic, politically inclined lawyers at lower levels."

This change in government attitude would require a clear understanding of who or what is to be protected and from whom, Spahr said.

## Supreme Court To Hear Gas Case

**The U.S. Supreme Court will decide next fall whether the Federal Power Commission can bar transportation arrangements between Transcontinental Gas Pipe Line Co. and Consolidated Edison Co., New York.**

The Third Circuit Court of Appeals held previously that FPC exceeded its authority in refusing to certificate Transco. The government appeal contended the lower court ruling "would permit a vast, new unregulated interstate market for gas" if it is not reversed.

Under the arrangement, Transco was to move natural gas that Con Ed purchased in the Southwest to the latter's steam-electric plant in Watertown, N. Y.

The New York utility planned to use the gas as boiler-fuel to reduce air pollution. FPC's denial, however, contended that the potential effect of the transaction on price and availability of gas outweighed the purpose.

# NOJC Gets Polite 'No' From API

**The National Oil Jobbers Council demand for an American Petroleum Institute study of marketing profits has been turned down—but NOJC president E. K. Bennett isn't unhappy.**

Bennett, a Longview (Tex.) jobber, received a detailed letter from API President Frank M. Porter citing specific reasons why API couldn't undertake such an industrywide project.

He declined to release the text of the two-page reply, but he said that he personally was pleased with its over-all tone, and the way the NOJC request was handled.

Porter's comments, he went on, indicated that "a great deal of study and thought went into our request." But actually, he said, the type of reply was about what he had expected.

**The basic reason given by API centered around the many variations in bookkeeping methods and techniques of the oil companies that would be involved in such a study.**

What NOJC had demanded (PW —Nov.13'59,p21) was regular publication of the average profit and loss figures of the industry, the data to be collected and compiled by a competent firm hired by API.

This isn't possible, Porter advised NOJC, because there's no uniformity in bookkeeping procedures among the oil companies, and the figures would not be statistically comparable.

To NOJC's request that uniform auditing procedures be set up to get around this, the API president said this approach isn't feasible either, because individual companies treat their expenses in different ways.

Bennett added: "You would just have to see [the letter] to get all of their reasoning."

**NOJC has its next regular meeting scheduled for May 15-18 in Washington,** so presumably the letter will be discussed by the membership at that time.

# Largest Firms Net Only 8% of Gross

**All but five of the top 25 oil companies ranked by gross income had an increase in net profits in '59.**

Net profits industry-wide ran close to 9% above the 1958 average. But it must be remembered that 1958's profits were 25% below 1957.

Not all companies shared in the general business recovery in 1959.

Atlantic Refining Co. experienced the largest decrease among the leading companies—16.5%. Gulf Oil Corp. reported an 11.9% drop in net for the year. Sinclair Oil Corp. and Signal Oil & Gas Co. reported net decreases in 1959 of 8% and 7% respectively. Standard Oil Co. of California's earnings slipped 1.6% under the previous year.

**The largest increases in net income went hand in hand with big boosts in crude production.**

Tidewater, whose net income soared 1,197%—the most significant gain by far—increased its crude oil production more than 13% as a result of resumption of full capacity production in the company's California heavy-oil fee properties, and increased allowables in Louisiana.

Ashland Oil & Refining Co.'s net was up 38.9% and its crude output up 158%, mostly accounted for by increases in Venezuela.

Phillips, with an increase in net income of 24.4%, boosted its net crude production 39%, all in the U. S.

**Companies whose operations are primarily in the U. S. were among the leaders in the ratio of net to gross income.**

Amerada Petroleum Corp., for several years the leader in the percentage of gross income carried to net, had a net-to-gross ratio of 23.5% last year, up slightly from 21.9% in 1958.

**Among the larger companies, Standard Oil Co. of California, which ranks sixth in gross income and fifth in net crude production, carried the highest percentage of gross to net.** Its net income was 13.3% of the gross revenues.

Net profit of Texaco Inc. amounted to 12.5% of its gross; Gulf Oil Corp. carried 9% of its gross to net; Standard Oil Co. (N.J.), the top ranking company, again carried 7.2% of its gross to net; and Socony Mobil's ratio of gross to net was 5.2%.

**Five companies moved up in rank among the top firms in terms of gross income.**

Gulf Oil Corp. moved from third into second place. Continental Oil Co. nudged Sun Oil out of 11th place, up from 12th in 1958. Pure Oil Co. moved up two places, and now ranks 13th in gross income. Sunray edged up from 18th to 17th, while Ohio Oil moved from 21st to 19th spot.

**Acquisition of additional throughput capacity played a part in increasing some company earnings.**

Sunray Mid-Continent Oil Co. upped refinery runs 49.4% as a result of its merger with Suntide Refining Co. in October, 1959. The company's net income increased 7.7% in 1959. (The figures include Suntide's operations for all of 1959.)

Ohio Oil Co. increased its refinery throughput 142% by acquiring Aurora Gasoline Co., which became a wholly owned subsidiary in 1959. Ohio's net was up 20% from 1958.

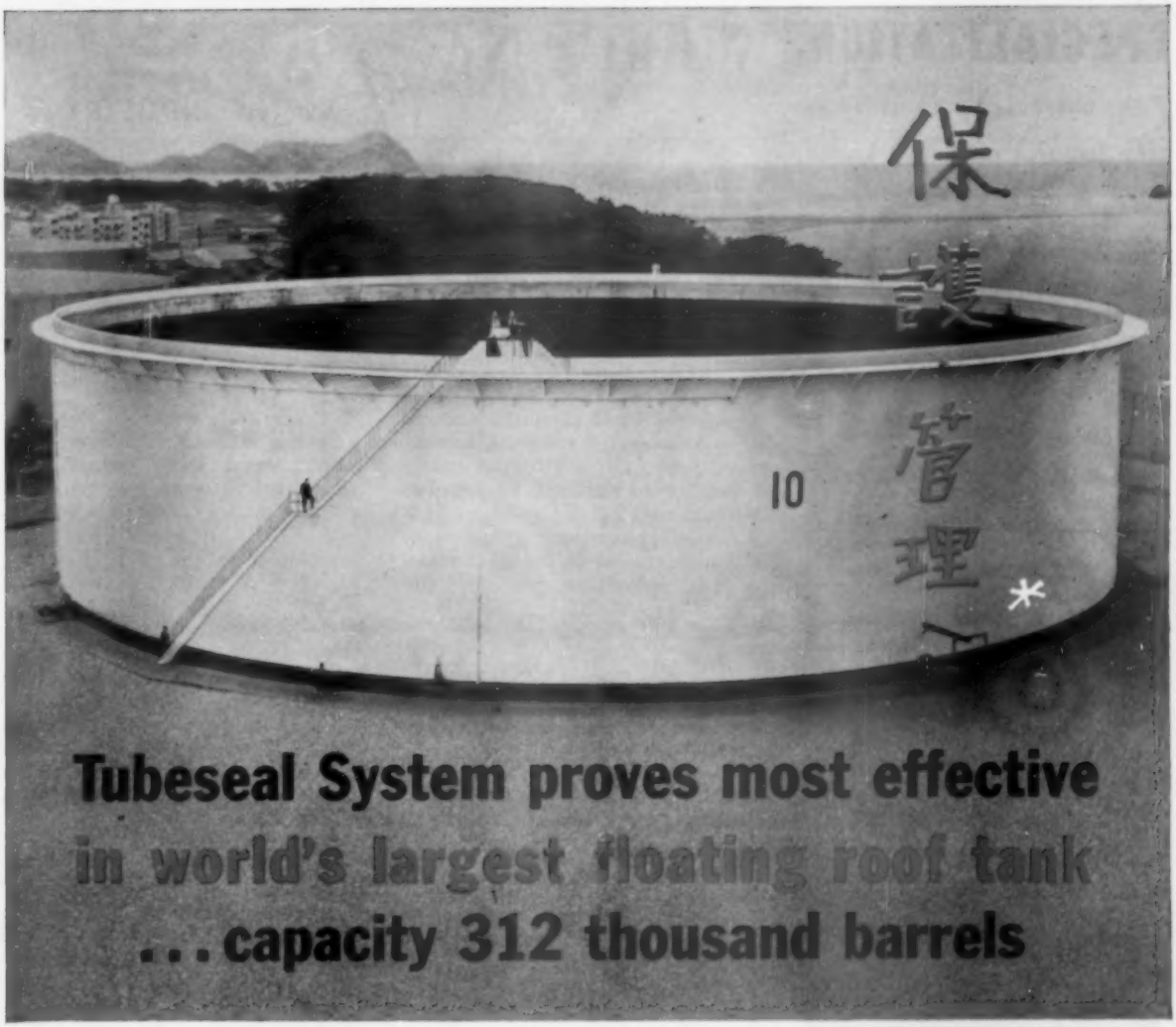
Signal Oil & Gas Co. proved an exception. Mergers with Bankline Oil Co. and Eastern States Petroleum & Chemical Co. brought about an increase of 359% in the company's refining capacity. (The company had also merged with Hancock Oil Co. earlier in 1958.) Net income, however, fell 7% below 1958.

## How the 25 Top Companies Line Up

(Asterisks indicate change in rank)

| Company | GROSS INCOME Rank '59 | Rank '58 | 1959 (Thousands) | % Chg. '59 - '58 | NET INCOME Rank '59 | Rank '58 | 1959 (Thousands) | % Chg. '59 - '58 | NET CRUDE PRODUCTION Rank '59 | Rank '58 | 1959 (b/d) | % Chg. '59 - '58 | REFINERY RUNS Rank '59 | Rank '58 | 1959 (b/d) | % Chg. '59 - '58 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jersey Std. | 1 | 1 | $8,714,061 | + 5.5% | 1 | 1 | $629,778 | + 12.0% | 1 | 1 | 2,146,000 | + 5.8% | 1 | 1 | 2,789,000 | + 12.1% |
| Gulf Oil | 2* | 3 | 3,202,773 | — 0.6 | 3* | 2 | 290,467 | — 11.9 | 2 | 2 | 1,304,183 | + 3.3 | 5 | 5 | 685,101 | — 1.9 |
| Socony Mobil | 3* | 2 | 3,156,642 | — 3.2 | 5 | 5 | 163,952 | + 4.6 | 5 | 5 | 669,000 | + 3.7 | 3 | 3 | 939,000 | + 7.9 |
| Texaco | 4 | 4 | 2,830,796 | + 9.7 | 2* | 3 | 354,346 | + 13.9 | 3 | 3 | 1,110,008 | + 10.8 | 2 | 2 | 1,219,032 | + 8.4 |
| Indiana Std. | 5 | 5 | 1,980,779 | + 5.2 | 7* | 6 | 139,597 | + 18.5 | 7 | 7 | 307,686 | + 7.8 | 6 | 6 | 598,280 | — 6.6 |
| California Std. | 6 | 6 | 1,909,064 | + 0.3 | 4 | 4 | 253,599 | — 1.6 | 4 | 4 | 836,892 | + 4.0 | 4 | 4 | 788,463 | — 0.9 |
| Shell | 7 | 7 | 1,819,954 | + 8.7 | 6* | 7 | 147,418 | + 14.6 | 6 | 6 | 315,901 | + 4.7 | 7 | 7 | 489,753 | + 5.6 |
| Sinclair | 8 | 8 | 1,246,363 | + 3.7 | 11* | 9 | 45,526 | — 8.0 | 10* | 8 | 161,041 | — 6.2 | 8 | 8 | 441,718 | + 3.0 |
| Phillips | 9 | 9 | 1,179,247 | + 9.0 | 8 | 8 | 104,639 | + 24.2 | 9* | 10 | 164,855 | + 39.0 | 10* | 11 | 237,184 | + 8.6 |
| Cities Service | 10 | 10 | 994,879 | — 2.0 | 10* | 11 | 50,620 | + 11.7 | 13* | 12 | 124,745 | + 6.5 | 9 | 9 | 280,002 | + 2.0 |
| Continental | 11* | 12 | 786,752 | + 4.6 | 9* | 10 | 60,272 | + 24.5 | 8* | 9 | 178,639 | + 18.2 | 14* | 16 | 179,009 | + 12.9 |
| Sun Oil | 12* | 11 | 746,265 | + 3.1 | 13* | 15 | 42,844 | + 33.6 | 12* | 13 | 129,408 | + 17.1 | 11* | 10 | 232,356 | + 2.2 |
| Pure Oil | 13* | 15 | 621,437 | + 6.2 | 17* | 16 | 28,905 | + 0.3 | 20* | 21 | 65,636 | + 10.2 | 16* | 15 | 154,356 | + 1.5 |
| Tidewater | 14* | 13 | 559,442 | + 1.2 | 15* | 25 | 33,941 | +1197.4 | 15* | 16 | 97,051 | + 13.3 | 12 | 12 | 223,485 | + 4.6 |
| Atlantic | 15* | 14 | 541,274 | + 0.6 | 16* | 13 | 30,174 | — 16.5 | 11 | 11 | 137,699 | + 15.4 | 13 | 13 | 194,413 | + 4.1 |
| Union Oil | 16 | 16 | 512,962 | + 4.2 | 20* | 18 | 27,515 | + 10.1 | 16* | 14 | 91,877 | — 1.3 | 15* | 14 | 172,682 | + 5.0 |
| Sunray | 17* | 18 | 450,989 | +21.1 | 12 | 12 | 43,815 | + 7.7 | 18 | 18 | 78,515 | + 5.7 | 17* | 20 | 154,027 | + 49.4 |
| Ohio Std. | 18* | 17 | 396,638 | + 0.5 | 21* | 19 | 25,061 | + 4.2 | 23 | 23 | 38,941 | + 10.3 | 18 | 18 | 138,986 | + 8.5 |
| Ohio Oil | 19* | 21 | 349,472 | +27.4 | 14 | 14 | 38,633 | + 20.1 | 14* | 15 | 97,887 | + 8.7 | 21* | 22 | 100,268 | +142.0 |
| Kentucky Std. | 20* | 19 | 307,858 | + 3.7 | 24* | 23 | 14,726 | + 4.8 | --- | --- | --- | --- | --- | --- | --- | --- |
| Ashland[1] | 21* | 20 | 300,644 | + 7.3 | 25* | 24 | 14,349 | + 38.9 | 24 | 24 | 21,000 | +158.4 | 20* | 17 | 136,576 | + 1.4 |
| Richfield(L.A.) | 22 | 22 | 269,932 | + 4.5 | 18* | 21 | 28,058 | + 39.6 | 19* | 20 | 72,164 | + 16.3 | 19 | 19 | 137,814 | + 15.8 |
| Skelly | 23 | 23 | 257,688 | + 0.7 | 19* | 17 | 27,992 | + 1.1 | 21* | 19 | 64,465 | + 0.6 | 23* | 21 | 48,882 | — 0.2 |
| Signal | 24 | 24 | 194,245 | +34.0 | 23* | 22 | 16,257 | — 7.0 | 22 | 22 | 63,900 | + 11.7 | 22* | 23 | 86,300 | +359.0 |
| Amerada | 25 | 25 | 102,367 | — 0.4 | 22* | 20 | 24,023 | + 6.8 | 17 | 17 | 82,478 | + 3.3 | --- | --- | --- | --- |

[1]Fiscal year ended Sept. 30.

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# What's New / IN THE INDUSTRY

**"Good results" are being obtained in field tests of a revolutionary rock bit that is said to employ neither cones nor rollers.**

The bit is being developed by a research affiliate of a major oil company, and is expected to have its major application in turbo and rotary percussion drilling.

Elimination of cones and rollers presumably would eliminate bearings, a major source of failure in conventional bits.

Penetration tests and bit life during field tests are said to be excellent in several formations.

Announcement of the bit development is expected sometime this summer.

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**New York Central R.R. is studying the possibility of building a products pipelines along its right-of-way in New York state.**

A spokesman said the company is now trying to line up customers, but declined to give further details.

•

**Doubt that Congress will reduce the federal tax on gasoline on completion of the present highway program was voiced this week** by Ellis L. Armstrong, U.S. Bureau of Public Roads Commissioner.

He predicted, in an address to the Colorado Society of Engineers, that Congress will be asked to increase the federal gasoline tax another ½¢ per gal. next year.

"But that's all," he said, indicating that the new hike would "allow us to complete financing of the federal road program by 1975."

•

**North Dakota soon will have its third refinery back in operation.** Pacific State Oil Co., Billings, Mont., has purchased the Queen City Oil Refinery at Dickerson, N.D., in bankruptcy proceedings, and plans to reopen it within two months. Jet fuel will be produced, and new equipment will be added to manufacture high-octane gasoline.

•

**Members of the Texas Independent Producers & Royalty Owners** Assn. will get a foreign affairs treat next month. At the May 2 meeting in Tyler, Abdullah Tariki, Saudi Arabia's director of petroleum minerals, will speak and the following day, there'll be another address by Dr. Juan Pablo Perez Alfonzo, Venezuela's Minister of Mines & Hydrocarbons.

•

**There's a possibility that Texas may have a new "deepest producer" before long.** If it proves up, it'll be Atlantic Refining Co.'s No. 1 J. C. Kelly, section 8, block 51, township 10 north, T&PRR survey, 31 mi. west of Ft. Stockton, Pecos county.

Gas showings in the Devonian between 15,798 ft. and 15,923 ft. already assure it of being the state's second deepest producer. Plans now are to test the Ellenburger between 18,590 ft. and 19,696 ft. If successful, it would surpass Pure Oil's Galveston county well, which produces from 16,264-312 ft.

•

**An official of Rhode Island Refining Corp. concedes it would be "economic suicide" to construct a planned 30,000 to 40,000 b/d refinery without a quota.** He said the proposed $38-million refinery scheduled for Tiverton (R.I.) will not be built so long as import controls are in effect. "Not enough crude is allowed into the country to justify a [new] refinery," the spokesman says.

•

**Tests are under way to determine whether atomic power can be used to fuel airplanes.**

The Atomic Energy Commission has announced that a $1.1-million nuclear reactor has been installed at the Oak Ridge (Tenn.) National Laboratory as part of the program to develop a safe nuclear-powered aircraft engine.

•

**Kerr-McGee Oil Industries is the third company to prorate its Oklahoma crude purchases in recent weeks.** It notified the Oklahoma Corporation Commission that it plans to reduce its purchases in May and June by 20% of the March level.

# A Life And Death Power Over Oil Mergers

Sometimes a tool of justice can become a tool of injustice.

A case in point—and an increasingly significant one for the oil industry—is the Justice Dept.'s growing threat of temporary injunctions to block proposed corporate mergers.

On the surface, use of a temporary injunction sounds fair enough. It is intended, at least theoretically, to put only a temporary freeze on a proposed move until the merits of the case can be judged by a court of law.

But in actual practice, because of the special circumstances involved in most mergers, a temporary injunction has the opposite result: It is tantamount to a complete veto of the proposed merger.

* * * *

The reason is simple. The temporary injunction would force the parties to delay their actual merger for quite a period—often several years—until their case could get space on a busy court calendar and get a verdict.

The company proposing to acquire another through a merger sometimes can afford to sit out such a period.

But not so the company which is to be acquired. Obviously, no going business concern can afford such a long period of uncertainty over its future existence.

The impact on the morale of its entire organization—with the likely loss of key personnel—alone could be disastrous. Then, too, it would face further serious deterioration of its business in terms of customer relations, and in the necessary suspension of forward planning and major business commitments.

Clearly, these risks are far too great to take on an uncertain, eventual court verdict.

* * * *

So all the Justice Dept. has to do is merely to threaten a "temporary" injunction, and the parties concerned have little practical alternative but to abandon their deal.

This is exactly what happened to the recent proposed Texaco-Superior and Sohio-Leonard mergers.

Maybe the Justice Dept. was right in claiming that these particular oil mergers would have reduced competition. And then, again, maybe it was wrong. Perhaps it would have been no more successful in making its allegations stand up in court than it was in the recent Tulsa oil "price conspiracy" trial, which it lost outright.

The important point is that these mergers were killed not on the basis of the legal merits or demerits of the actual facts involved—but by the use of a gimmick.

This is especially significant today for two reasons:

(1) Many new mergers are being contemplated currently in the oil industry.

(2) The department is shifting its own emphasis in antitrust enforcement away from the long, dramatic antitrust cases of recent years to a new "antimerger" drive.

And the department holds all the trump cards.

In short, the "temporary" injunction device gives a small group of men in the Justice Dept. complete power of life and death over all mergers—without any proper judicial checks on that power.

It is one thing for the Justice Dept. to move conscientiously against all mergers it considers against the public interest.

But it is something else again for it to kill them in advance in such a way that for all practical purposes the parties are denied due process of law.

This is an abuse of the fundamental intent of the temporary injunction.

If the Justice Dept. genuinely believes a proposed merger would substantially lessen competition, it can warn the parties that it plans to proceed against them.

Then if the companies still feel they have a good enough case to proceed with the merger anyway, they should be allowed to do so at their own risk. At least, they will not have been denied a chance to test their rights.

* * * *

It is the companies, not the Justice Dept. that take the real risk in a merger. For if the action later is found illegal, the courts will usually order a break-up of the merged operations.

The Justice Dept. sometimes makes a big point of the difficulty of unscrambling mergers, as a justification for using the "temporary" injunction to block them.

This is a poor justification indeed. Many merged properties can be divested quite easily. Even the complicated ones are not impossible, as witnessed by the number of times it has been done effectively in recent cases.

If the Justice Dept. is still convinced that an unscrambling would be impossible in some particular instance, then it should limit its use of the temporary injunction at most to a court order directing how the merger should be handled pending its litigation. (For instance, if a major company acquires another refining and marketing company, it could be directed to operate that unit as a separate division for the time being.)

After all, the Justice Dept. should remember that its function is to enforce the antitrust laws—not to act as prosecutor, judge, and jury all rolled into one.

# Looking Ahead in Washington

Mc-Graw-Hill
Washington
Bureau
April 22, 1960

**Chances are diminishing for an early Federal Power Commission ruling on the Phillips gas case.** FPC members started formal consideration of the case almost seven months ago, upon completion of oral arguments. Even some producers strongly against utility-type controls were hopeful that the regulatory maze might be clarified with FPC determination of the case. Earlier this year, there was optimism within the commission that a decision could be reached before the annual vacation month of August. Now two developments have caused that picture to darken.

**The current fluid situation on FPC membership means no major decisions will be made any time soon.** A successor to the late Commissioner John B. Hussey will need considerable time to familiarize himself with the details of the complex Phillips case. And odds are that a shakeup of other FPC members may come soon. Remaining commissioners are not apt to make a weighty ruling with an abbreviated membership.

**Another factor is Phillips' own bid to hasten a ruling on the case.** The company now is asking that settlement be made on the basis of current contract rates. Intervenors, including the FPC staff, fear that acceptance of the Phillips offer would postpone any chance of clearing the regulatory air for a lengthy time.

**A fight is brewing over this Phillips move.** The commission's decision on the company offer will take time which otherwise might have been devoted to considering the case's issues. Should FPC accept the Phillips offer, the case would lose most of its steam as a precedent-setting device.

If FPC rejects the compromise, it would then return to the basic case. But time would have been lost. So a decision by August now appears unlikely; even a ruling by the year's end is questionable.

•

**Top Washington officials are being called upon by Texas producers to consider the "rapid deterioration" of the oil imports program.** Soon after the latest increase in residual fuel oil import allocations, Harry C. Jones, president of the Texas Independent Producers & Royalty Owners Assn., asked for an immediate conference with three cabinet members. Tipro requested an opportunity to demonstrate to Secretary of Interior Fred A. Seaton, Treasury Secretary Robert B. Anderson, and Secretary of Commerce Frederick H. Mueller that the existing program "is not meeting the goal established . . ."

**The Administration will stand its ground on the imports level.** Seaton, charged with operation of the program, is satisfied with it. Anderson's and Mueller's departments have generally concurred. And there is an added technicality. When mandatory controls on imports were ordered more than a year ago, President Eisenhower relieved his cabinet committee of further responsibility for the imports program. There is presently no governmental committee charged with hearing and weighing protests against the program.

•

**Coal leaders are scrambling for means to combat imports of Canadian gas.** Canada's decision to license several export projects is causing a Chicago meeting of coal and railroad interests this week to consider "appropriate steps" to ward off the threatened competition.

### HYDRO-SPRING TESTER

A combination tester and locked open by-pass operated by vertical movement of drill pipe . . . Aids in the easy, rapid descent of the string and in the elimination of formation and packer damage . . . provides positive indication when tool opens.

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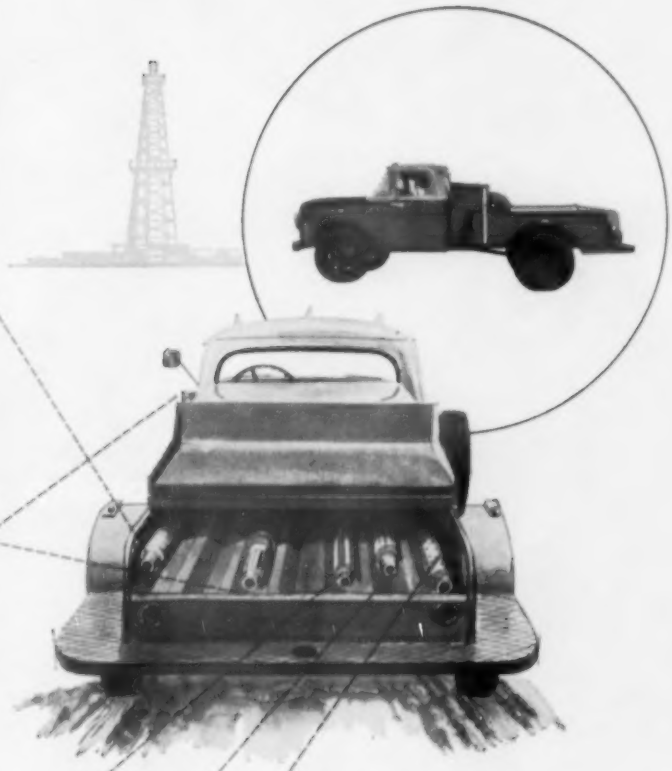

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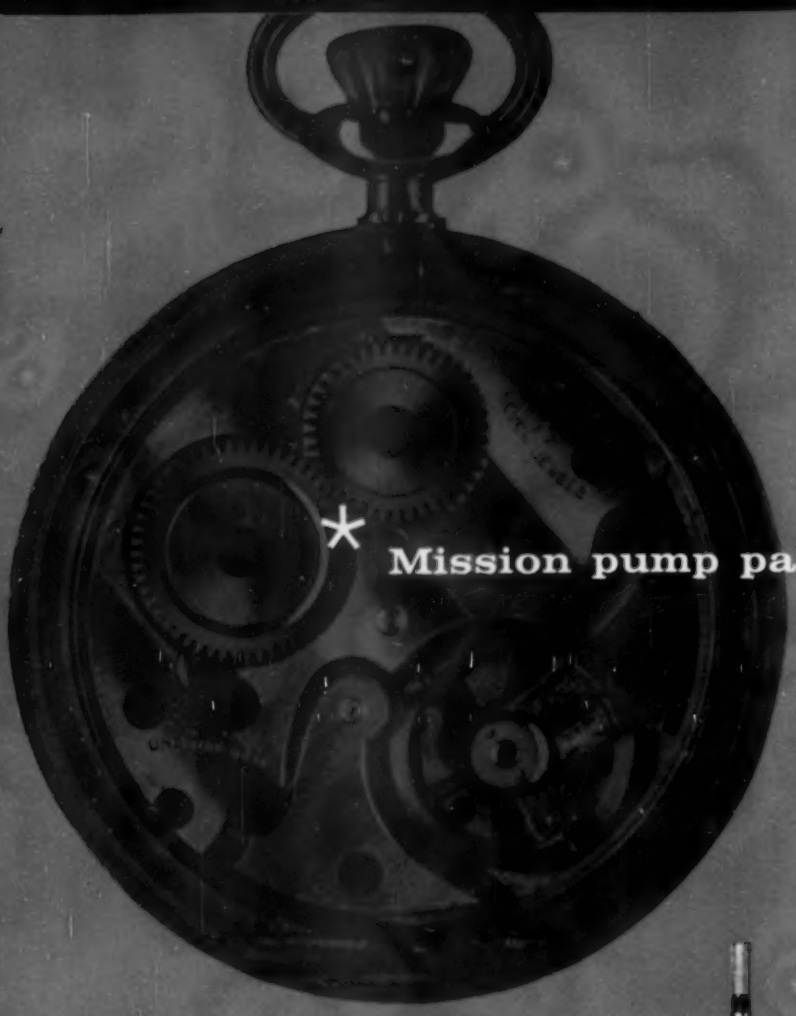

# *Mission pump parts work together

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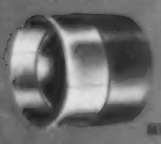

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# Oil Replacement Costs Rise in Rockies

**Oil replacement costs in the Rocky Mountain area have increased by 52¢ per bbl. since 1957.**

They were $2.25 per bbl. last year, against $1.73 in 1957, according to R. E. Megill, of the Carter division of Humble Oil & Refining Co.

Ten years ago, he said, replacement costs in the Rockies were $1.20 per bbl.

**The price of crude in the Rockies, unlike some areas, is still above replacement cost, but the margin has narrowed in the past two years.**

The average per-barrel price in 1957 was $2.83. It's now in the neighborhood of $2.70.

Replacement costs, he said, are not an indicator of current book profits; they are an indicator of future profits. They deal with costs associated with barrels found, most of which will be produced later.

If the industry is to supply its share of the future energy market, he pointed out, replacement cost must be kept below future crude prices.

And since the many facets of crude competition virtually prohibit price increases commensurate with cost increases, producers are forced to cut costs, he added.

**The only way to determine which costs must be reduced in order to stay below crude prices is to analyze replacement costs,** Megill said.

Three different per-barrel costs—finding, developing, and operating—are included in replacement costs. The reason for the three different groups is the need to reflect current replacement costs.

The new crude that's needed to replace the crude that is sold, he said, is replaced at today's cost.

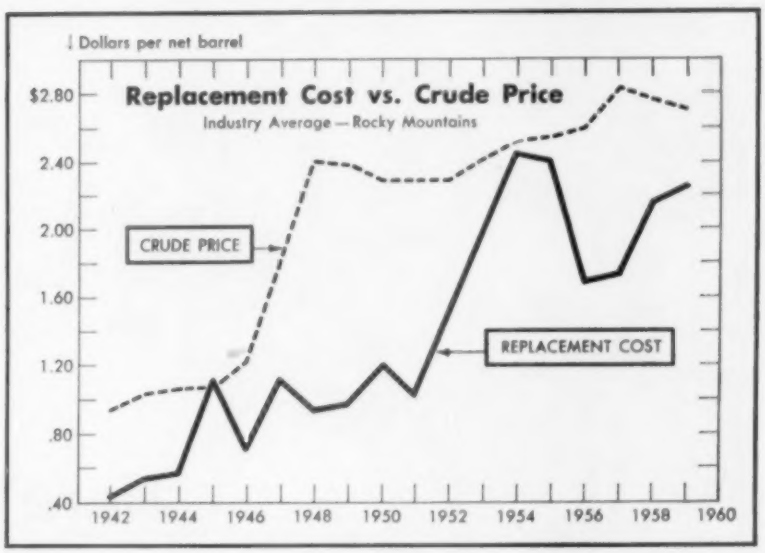
Of the $1.73 per bbl. total replacement costs in 1957, finding amounted to 69¢, developing was 35¢, and operating was 69¢.

Finding cost per barrel in 1959 in the Rockies, one of the more favorable areas for oil exploration, was around $1.07.

**Oil-finding cost is the most difficult to determine in computing replacement costs.**

If for lack of current data, he said, management must wait five years to determine finding cost per barrel, proper investment decisions can't be made.

This information can be estimated currently by adjusting barrels found and developed to a final probable basis (PW—Mar.20'59,p35).




The necessary calculations, Megill said, are: (1) separation of all petroleum reserves by year of discovery; (2) tabulation of current estimates of reserves by year of discovery; and (3) statistical correction of current estimates for future reserve additions, both primary and secondary.

**Five other uses can be made of data available from replacement-cost analyses.**

Megill listed these as: (1) optimizing budget expenditures; (2) providing a basis (with other data) for calculating current and future rates of return on exploration expenditures; (3) establishing yardsticks for purchasing properties; (4) supplying useful information about the industry for dissemination; and (5) providing cost trends to aid planning.

By using data available and replacement-cost trends, he added, an oil company can plan its exploration and production program wisely, and can gain some useful knowledge of future profits.

Megill's findings were presented at Casper, Wyo., this week at the Spring Meeting of the Rocky Mountain District of the API Division of Production.

# Automation Cuts Recovery Costs

**Phillips Petroleum Co.'s big North Burbank (Okla.) unit waterflood is now being operated almost completely automatically, with consequent reductions in operations costs.**

Phillips' E. B. Clark reported that the near-total automatic operation of the unit waterflood was made possible by the addition during the past year of new mechanical and electrical equipment.

Speaking at this week's meeting of the Rocky Mountain District, American Petroleum Institute's Division of Production, at Casper, Wyo., Clark added:

"From the ordinary equipment used in 1951 [when a pilot flood was started] to inject water and to produce and sell the oil, the North Burbank unit has grown into a mechanical giant that now produces and processes more than 23,000 b/d of oil and 165,000 b/d of water."

Clark said the equipment additions made during the past year provide essentially unattended operation of the waterflood, except for preventive maintenance, equipment failures, or drastic changes in conditions not covered by automatic operations.

**The water system for the Osage County project is also operated by**

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The big plus feature — Grove G-5 valves never need lubrication. Grove series 150 G-5 valves are available in lever or handwheel operated models, sizes 2" through 36".

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**Phillips and is completely automatic.**

At the beginning of the pilot flood, Phillips designed and constructed a raw-water supply system with a capacity of 300,000 b/d. Water is obtained from seven gravel-packed wells along the Arkansas River in Osage County.

Deep-well turbine pumps, driven through right-angle gears by single-cylinder engines, maintain a constant level in a 44,000-bbl. surge tank.

From the tank, water is boosted by four 450-hp. Ingersoll-Rand engines and two-stage centrifugal pumps to maintain a constant discharge pressure of 180 psi. The raw water is distributed through 7 mi. of 30-in. line to one of the largest waterflood areas in the world, involving six major waterflood projects.

The water system, termed the "Ark-Burbank," is operated by Phillips' unit personnel. One operator spends four hours per day cleaning and checking the entire equipment. The system operates unattended the other 20 hours.

A telephone signal alarm system from the plant is tied into the overall unit signal network, and a trouble-identification board facilitates repairs to malfunctioned equipment.

**The present equipment adjusts itself automatically to most changes in the unit waterflood operation.**

Clark said these include the following operations, or changes in conditions:

(1) Variations in the sediments produced and in the water-oil emulsions requiring special treating compounds.

(2) Mixing water of changing incompatibility.

(3) Rapid and unpredictable well stimulation caused both by flooding itself and by sand-fracture treatments.

(4) Wide fluctuations in water-oil ratios, gas-oil ratios, and crude gravities.

"Waterflooding is further complicated by the unpredictable leftovers of the earlier surgeons of primary production," Clark said. "Uncontrolled flooding; sparse records; poor well completions; salt-water disposal; damaged casing; casing and liners that are corroded and leaking; improperly plugged wells; old shot holes; junk let in wells —all these contribute their share to condition changes."

**Only one lease foreman and one subforeman are needed to supervise 4,000 acres of waterflood production in the unit. Other labor needs are small.**

The operation involves four automatic tank batteries, operated by one battery pumper, and 217 producing wells and 181 water-injection wells, operated by four well pumpers—or about 100 total wells for each.

Preventive maintenance and scheduled equipment checking is performed bimonthly by a field mechanic crew (mechanic and helper) and monthly by a well tester.

At peak production, Clark pointed out, these workers may be responsible for the handling of 16,000 b/d of oil and 110,000 b/d of water, plus the clarification and injection of 120,000 b/d of water. Most of the unscheduled maintenance is handled by a centralized maintenance group, serving all foremen areas.

**Certain design features are common to all of the systems and subsystems at North Burbank.**

Clark explained that almost all equipment fails safely—that is, its failure will not cause damage to other equipment, will not shut down the production of oil, and will not cause waste or pollution. Emergency storage of both oil and water is provided until equipment malfunctions can be corrected and normal operations can be restored.

Equipment failures and major condition changes also are signaled immediately to the operator.

He added that protection is pro-


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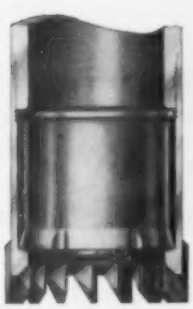

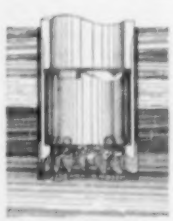

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Both the upper and lower catcher dogs serve to hold ANY load securely while coming out of the hole.

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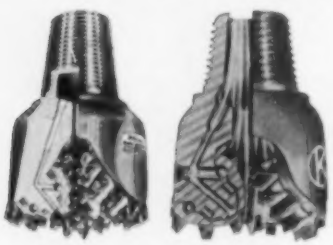

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vided automatically against winter freezing by either draining stagnant water lines and pumps, or by filling them with warm, clean oil during idle periods.

**The tank batteries are the heart of the unit waterflood.**

The tank batteries operate without the usual surface waste pits or ponds.

At North Burbank, Clark reported, there are three pipeline companies, all of whose facilities may be connected to take oil from a single tank battery.

Crude deliveries are made on the basis of complete read-out data for any desired period or time, and the percentage of basic sediment and water in the oil sold is controlled.

Clark subdivided the automatic tank batteries into seven subsystems to help explain the various operations performed. These are: (1) oil treating (including chemical-proportioning units); (2) lease automatic custody transfer; (3) trouble signal and identification; (4) gas venting and sales; (5) water clarification; (6) relief and oil skimming; and (7) water injection.

**Now that the major gaps in automatic operation of the unit waterflood have been closed, Phillips intends to concentrate on improving equipment and procedures.**

Full advantage must be taken of the equipment already in service, said Clark. "A certain amount of time is always required for education and catching up," he added.

Some of the goals to be sought this year include:

- Improved stuffing-box equipment on producing wells, so as to extend time between visits.
- Application of Phillips' manometer-type controls to tank-battery relief-tank operations and trouble-alarm signals.
- Improved tank-cleaning devices and procedures.
- Improvement of ACT instrumentation and controls through use of transistorized circuits and improved materials.
- Improvement and expansion of automatic chemical-proportioning devices for treating crude oil.

# Hemlock Aids Fluid-Loss Control

**Hemlock is now being used as a mud additive to help control fluid loss in drilling, particularly on the Gulf Coast.**

Researchers at Milwhite Mud Sales Co. say certain extracts of the hemlock tree, along with lignosulfonates, prove effective in drilling mud for controlling inhibition, dispersion, and fluid-loss.

This field-tested effectiveness, says Milwhite's R. A. Jung, "opens the way" to new concepts in drilling mud technology.

Benefits derived from using the additives, says Jung, are (1) decreased drilling time to target depth, (2) decreased trip time, and (3) decreased drilling costs.

**One big benefit of using hemlock is that it combats the tendency of formation clay solids to swell and yield viscosity.**

Statistics indicate, the company says, that more money is spent on the Gulf Coast to fight formation clay solids than for any other contaminant, such as high-pressure gas or salt water.

The clay contaminants—the ones that swell and yield viscosity and the ones that disintegrate into fine particles—become an integral part of the mud system and must be either chemically dispersed, mechanically removed, or diluted.

Fluid-loss control decreases the wetting rate of the clay particles in order to control viscosity, says Jung, but the conventional fluid-loss reduction materials also yield viscosity themselves.

By using lignosulfonates or hemlock organics, he says, the tendency for the fluid loss agent to build viscosity is lessened.

**Additives such as lignosulfonates and hemlock extract also are able to withstand the increasing pressures and temperatures of deep holes.**

Jung says that when these two additives are used with a little oil (10% to 12%), their fluid loss properties are stable at temperatures in excess of 350F and differential pressures up to 5,000 psi.

**This type of mud system appears to help increase bit penetration through high efficiency in removing cuttings from the hole,** says Jung.

He reports that the flow properties of the mud have been altered to such an extent that they tend to approach "turbulent flow at lower velocities," which increases the carrying capacity of the fluid.

It's his opinion that this results from the inhibiting characteristics of the drilling fluid, as well as the ability of the fluid to remove cuttings from the bit teeth.

# Drilling Costs Can Be Trimmed

**Drilling costs can be cut substantially if contractors would apply known principles.**

This point was stressed this week by K. P. Swenson and H. G. Schmit, both of the Carter division of Humble Oil & Refining Co.

The two engineers told the Casper (Wyo.) meeting of the Rocky Mountain District of the API Division of Production that there is a need for producers and drilling contractors to become "more aggressive" and willing to promote new and improved techniques.

Additionally, they said, there is a need for contractors to purchase the equipment necessary to apply proper rig hydraulics, and charge accordingly for their services.

**Use of jet bits and low-solid, low-viscosity muds was utilized, for example, to reduce drilling time 43% in the North Tioga field, Burke County, N.D.**

Swenson and Schmit said Carter's use of these concepts enabled the company to save about 8½ days of drilling time of a total of 19.8 days required for previous wells.

The mud used in the development drilling programs in the past generally consisted of low-water-loss, salt-saturated, oil-emulsion systems. Common practice has been to drill the upper bentonitic shales from below surface casing to about 5,400 ft. with either fresh water or produced brine, and then convert to an oil-emulsion mud. The Charles (Mississippian) evaporite beds that occur at about 7,100 ft. are drilled with a salt-saturated system to minimize hole enlargement that would occur from dissolving salt out of the formation.

The optimum rig hydraulics program, utilizing jet bits selected for Tioga, was based on the concept of an optimum circulating rate. This optimum rate takes into account the physical limitations of the rig.

Based on laboratory and field tests, cleaning effectiveness at the bit is directly proportional to hydraulic impact, which is the product of the circulating rate and the fluid velocity through the bit nozzle, they said.

"Hydraulic impact will not cut hole by itself," they added, "but will clean the bit and remove the cuttings from below the bit before they can be reground.

"Once there is enough hydraulic impact to clean the hole effectively, additional hydraulic impact will not further increase penetration rates.

"At this point, the only way to increase penetration is to generate more rock chips by increasing the speed of the rotary table or by adding more weight at the bit."

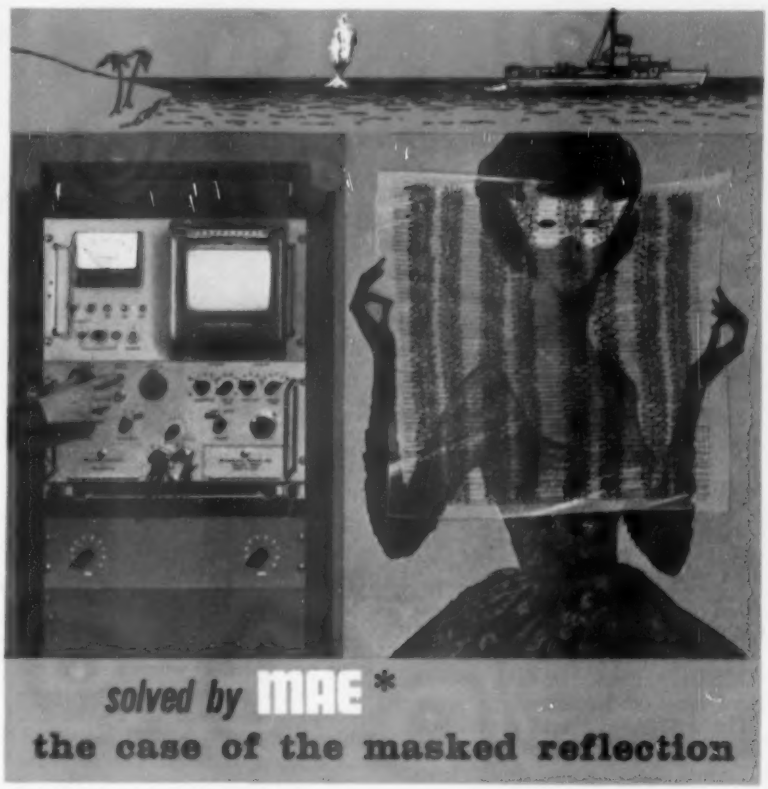
**Successful use of these concepts at North Tioga has led to their use in other areas, with similar success,** Swenson and Schmit reported.

The Carter engineers emphasized that each well and area has to be evaluated on its own to support somewhat drastic changes in drilling techniques. However, they said, the result in each case in which these improved drilling practices have been applied has been "a substantial reduction" in the number of rotating hours needed to reach total depth.

This has led to a resultant decrease in the over-all direct cost of making the hole.

Prior to 1959, they noted, the dry-hole cost for a North Tioga field test was $73,000.

Now they can be drilled for $47,000, or a reduction of 36%.

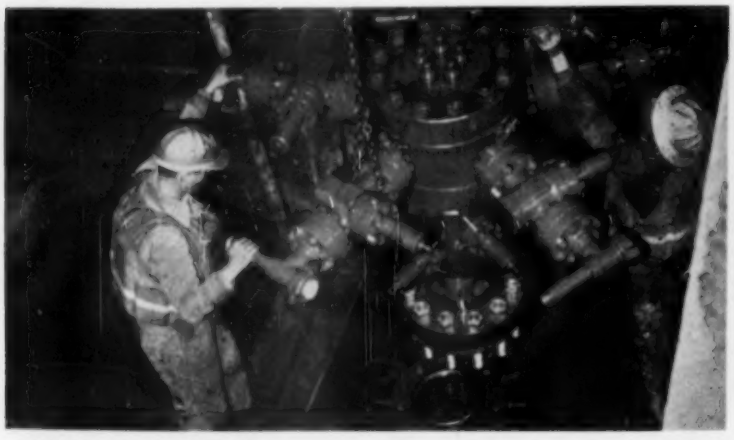

"Singing" marine seismic records, on which valid sub-surface reflections are masked, were once an unsolved case in offshore exploration.
Today "singing," or water reverberations can be eliminated by data processing through MAE, GSI's Multiple Analyzer Eliminator. MAE processed records provide information which was impossible to obtain in the past. GSI can process your records through MAE in several locations. If you are planning a marine seismic program in an area where water reverberations are a problem . . . or if you have a backlog of magnetically-recorded data which is masked by the singing effect, you will want to meet MAE.

*MAE is a GSI trademark

For a descriptive article on how MAE solved the case of the masked reflection, write GSI.

GEOPHYSICAL SERVICE INC.
900 EXCHANGE BANK BLDG. · DALLAS 35, TEXAS

HYDRAULIC SET PACKERS made by Brown Oil Tools are lined up on the mobile platform prior to use in history-making well.



BLOWOUT PREVENTERS are removed (left) prior to landing five tubing strings. National Christmas tree is being set (right) as . . .

# First Quintuple Completion Is Made

**Sinclair Oil & Gas Co. has completed the world's first quintuple-string producer.**

The history-making well is the No. 6-OCS-0439, Block 190 field, Eugene Island area, off Louisiana.

The well tested a total of 492-million cf/d of gas on open flow from six zones, ranging in depth from 6,156-7,104 ft., in the Pliocene.

The zones, and their potentials, are: Zone 1, 7,092-96 ft. and 7,100-04 ft., 102-million cf/d; Zone 2, 7,055-62 ft., 106-million cf/d; Zone 3, 6,968-72 ft., 59-million cf/d; Zone 4, 6,830-36 ft., 69.5 million cf/d; Zone 5, 6,359-65 ft., 30.5-million cf/d; and Zone 6, 6,156-66 ft., 125-million cf/d.

The venture is a joint operation with El Paso Natural Gas Co., Peoples Production Co., and Sohio Petroleum Co. owning 25% each. Sinclair is the operator.

The quintuple is located 40 mi. offshore in 72 ft. of water. It was drilled from Dixilyn Drilling Corp.'s "Julie Ann" mobile drilling platform.

Previous completions by the group in the area include a single oil completion and a quadruple gas completion.

**The 7,981-ft. hole was completed in six gas zones, of which five, at this time, will be produced simultaneously through five strings of 2⅜-in. OD tubing set in 9⅝-in. OD casing.**

A total of six Brown Oil Tools hydraulic set packers were run. Two of them were single-string Type HS-16-1 hydraulic set packers, with which the two lower zones were completed as alternate-zone completions. When the bottom zone is depleted, a plug will be run in the No. 1 tubing string and landed in the landing nipple to blank off the lower zone. The sliding sleeve opposite the next higher zone will be opened, and this zone will be produced through the No. 1 tubing string. This operation will be performed by wireline, eliminating the need for costly workovers when the bottom zone is depleted.

**The basic fact that made possible the quintuple completion is the technique of running five strings of tubing simultaneously.**

In past multiple completions, difficulty had been encountered as the number of parallel tubing strings run in the same hole increased, especially in deviated holes. The problems arose in running and stabbing auxiliary strings in the upper packer.

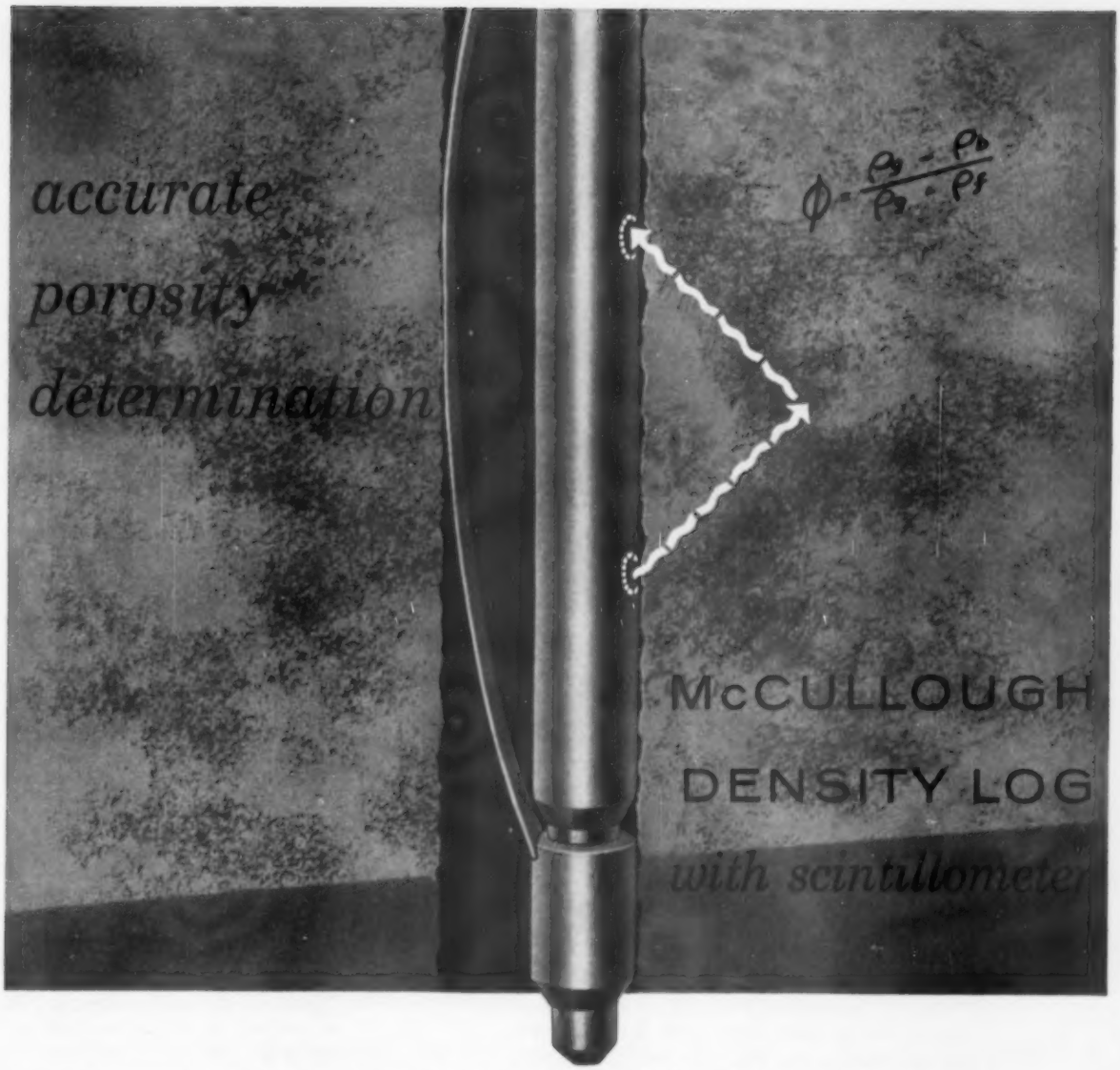
In order to eliminate this problem, Brown Oil Tools manufactured the first set of power-actuated, multiple-string, slip-type elevators. A power actuated multiple slip bowl also was manufactured to retain the five tubing strings in the rotary table while running the tubing.

**Before packers were run, tubing needed below the quintuple hydraulic set packer was tallied and spacing worked out on paper.**

The first packer, the single string Type HS-16-1, was started into the hole on Feb. 29.

A landing niple and flow coupling were run immediately above the packer.

Following this, a rubber-sleeve abrasion joint was set to protect the tubing opposite the producing zone from




A new advancement in the field of nuclear well logging – McCullough's Density Log accurately measures the bulk density of formations. This rock density is of prime importance in the interpretation of geophysical data. Where grain density values are known, porosity can be determined with accuracy.

The McCullough Density Logger is the only tool of its type that utilizes collimation, the Scintillometer and an energy or pulse height discriminator. By this method, a beam of gamma rays is directed into the formation by the source collimator and back-scattered gamma rays are accepted by the Scintillometer collimator. The discriminator is adjusted for recording gamma rays in the energy band that reflects deep penetration. The numerical intensity of these gamma rays is directly related to the density of the formation.

*Check these important features:*

- Accurately calibrated in the field with a calibration block of known density.
- Absolute zero is recorded on each log and a linear count scale enables the graphic conversion of counts per second to bulk density for logs run in any well.
- Bulk density, with the grain density of the formation minerals taken into consideration, is in turn graphically converted to accurate porosity values for various types of lithology.
- Responsive to the physical properties of the formation, not its chemical properties except as they relate to density.
- Bore hole fluid and hole size changes are not reflected in the log so long as the instrument maintains adequate contact with the side of the bore hole.
- Charts are provided to compensate for the presence of mud cake in arriving at true formation density.

**AVAILABILITY** – This service is being made available at our district offices as rapidly as possible. Check with the McCullough representative in your locality.

**McCullough** *TOOL COMPANY*

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sand-laden gas. The sliding sleeve was then run in closed position.

Sufficient tubing was run for correct spacing, and another Type HS-16-1 packer was made up in the No. 1 string. Immediately below this packer, a Brown Type CC "Criss-Cross" safety joint was placed to aid, if necessary, in later removal and retrieval of the packers.

The same equipment—landing nipple, flow coupling, abrasion joint, and sliding sleeve—were run above the second packer, followed by more tubing and another safety joint. This was followed by a Type HS-8-2C retrievable packer. This packer is equipped with a hydraulic holddown that assures firm seating.

Succeeding packers were run in much the same fashion, so that when the quintuple string packer was set in the string, about 2,600 ft. of tubing, packers, and related equipment had been run in a total elapsed time of 13½ hours.

After all the packers had passed through the rotary table, the segmented sections of the multiple tubing bowl were removed, and the one-piece multiple slips were placed in the housing.

**A stripper-type blowout preventer was flanged onto the well to assure control while running the strings.**

Five individual openings are provided in the stripper rubber. The five tubing strings were inserted through the stripper rubber and the stripper lowered and locked into a housing.

Metal slip segments internally located in the stripper rubber were provided to prevent the tubing from blowing out.

**A total of some 30,500 ft. of Spang 2⅜-in. OD tubing was run in the hole in 42 hours.**

All tubing is extremeline, except for some integral joint 8-round thread tubing, which was run in the upper portion of the No. 1 string.

The tubing strings were internally plastic-coated.

**The last joint of tubing in each string was selected so that all five strings would then land at the same point.**

A National Type FP-14 tubing hanger was installed. This consists of a mother hanger with five openings for the individual tubing hangers. The mother hanger was placed on the five strings with the slot opening on the side of the hanger facing in the proper direction for landing in the tubing head.

The tubing was properly oriented by orienting the No. 1 string when it was first run. With the hook locked, the tubing strings remained in the proper position while being run.

The individual string hangers were made up on the tubing strings and then landed in the mother hanger. The index pin was screwed into the set position in the tubing head and the hanger was thus properly oriented.

**A National Christmas tree was then installed. A master valve assembly, manufactured by Cameron Iron Works, was incorporated in the wellhead.**

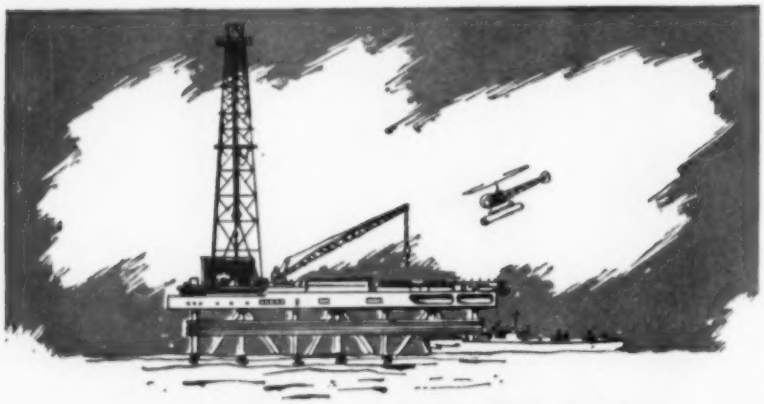
The tree includes a tubing spool, tubing hanger, quintuple port flow tree, crown member, and flow fittings manufactured by National Supply. The tree is 10 ft., 1 in. high and weighs about 9,100 lb.

The Cameron master valve assembly consists of two quintuple-ported, single-block valves. Cameron Type F gate valves were used as wing valves.

**Once the tree was set, the mud was displaced by completion fluid and packers were set.**

Reverse circulation down the casing annulus and out the No. 5 tubing string displaced the 11.7-lb.-per-gal. mud.

The mud was replaced by 11.2-lb.-

**LOSS PREVENTION SERVICE**
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YOUR INSURANCE AGENT or broker knows the importance of experienced handling in arranging proper coverage, and he knows how much proper servicing of losses can mean to you. For this reason he will probably recommend placing the insurance on your offshore oil drilling and production equipment with a specialized market such as Southern Marine which is located in the hub of the oil industry in the Western Hemisphere.

**Important too is Southern Marine's unique Loss Prevention Service. It is geared to work with you in preventing loss in an effort to (1) reduce future insurance costs, and (2) prevent equipment down-time. Even with full reimbursement for loss or damage, equipment down-time for repairs knocks out your income. Ask those who use our Loss Prevention Service how well it works for the insured.**

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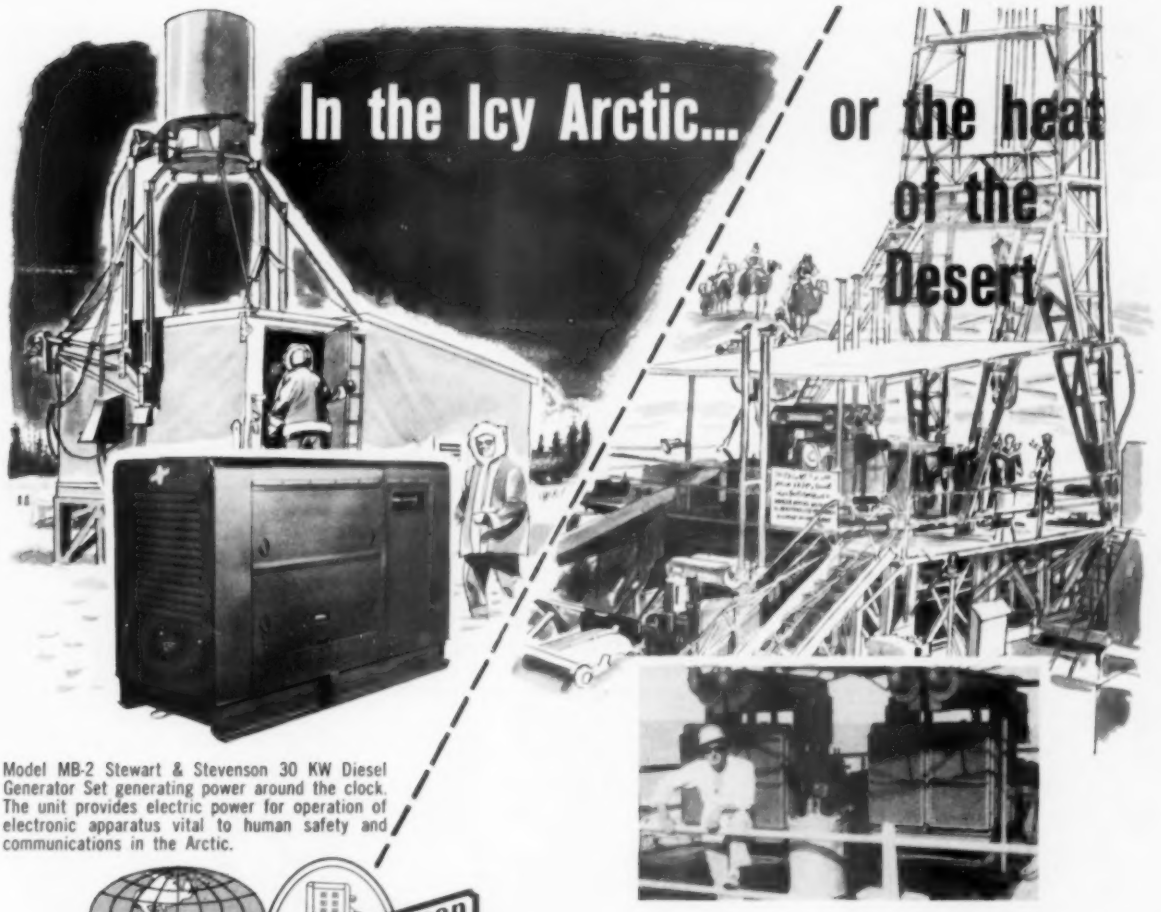


Model MB-2 Stewart & Stevenson 30 KW Diesel Generator Set generating power around the clock. The unit provides electric power for operation of electronic apparatus vital to human safety and communications in the Arctic.

Parker Drilling Company rig, powered with GM Model 12103 Diesel Engines. Lighting and auxiliary power are supplied by a Stewart & Stevenson oilfield Utility Unit and Rig Lighting Plant. The engines were properly equipped and modified by Stewart & Stevenson with special cooling and air intake systems.

STEWART & STEVENSON

*When it comes to diesel or gas engine power, Stewart & Stevenson experience and "know-how" have no boundaries.*

Here again are two diesel engine power applications . . . in direct contrast and in opposite parts of the world . . . with one important characteristic in common: both were designed and built by Stewart & Stevenson Services, the world's largest distributor of diesel engines. Both power applications are serving vital industries where thousands of dollars and valuable contracts are totally dependent on the reliability and performance of this engine driven equipment.

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per-gal. weighted water solution containing calcium chloride.

When this was done, the packers were actuated selectively by applying differential pressure across each one. This was done by pumping a plastic ball or a plug down the string until it seated in the packer.

Application of a predetermined amount of additional pressure above the ball energized the packer. After the packer was set, the ball was recovered by well flow or reverse circulation.

To set the two single string packers, a bronze ball was dropped down the tubing and seated on the shear sleeve below the lower-most single packer. The pressure in the No. 1 string was built up to 2,000 psi. The shear pins sheared, and the ball and shear sleeve fell to the bottom of the hole. Finally, the zones were swabbed and placed on test.

# What's New / IN EXPLORATION, DRILLING, PRODUCTION

**The Atomic Energy Commission is looking for a drilling contractor to drill 20 shallow holes at its test site near Mercury, Nev.**

The holes will be used in a series of tests using conventional explosives to precede experiments in nuclear excavating and power production.

High explosives detonated at various depths will help determine cratering effects expected from a subsurface explosion.

The commission plans to drill 390 ft. of 9-in. hole, going to 50 ft. in the deepest hole; about 170 ft. of 36-in. hole, going to depths from 7 to 27 ft.; and about 150 ft. of 48-in. hole, going to depths from 31 to 65 ft.

•

**Manufacturers of oil field machinery and tools shipped products valued at $588-million in 1958,** according to a preliminary report from the Dept. of Commerce.

The 1958 Census of Manufactures, conducted by the Bureau of the Census, shows that the 1958 shipments exceeded the 1954 total of $542-million by 8%. (No adjustments were made for the increase in price levels over the period).

Average employment in the period decreased from 33,700 to 32,200, but wages paid increased from $161.8-million to $176.5-million, a hike of 9%.

The census shows that, of nearly 300,000 establishments covered in the report, only 166 have 20 employees or more, compared with 158 such in 1954.

•

**Clark Oil & Refining Corp. will acquire Intex Oil Co. in exchange for Clark stock.**

The acquisition is subject to approval by directors of both companies and by Intex stockholders. For each five shares of Intex common, Intex shareholders would get one share of Clark common, one of preferred ($15 par) convertible to common on a share-for-share basis and one of nonconvertible preferred ($18 par).

Clark, headquartered in Milwaukee, has refineries at Chicago and New Orleans. It markets in nine states. Intex has production in California, Texas, New Mexico, Colorado, and Utah. It is based in Bakersfield, Calif.

•

**The Colorado Supreme Court last week ruled that the state can't regulate the price of natural gas sold directly to industrial users** by Colorado Interstate Gas Co.

The court, in a 4-to-2 decision, ordered the Colorado Public Utilities Commission to vacate a directive requiring Interstate to show cause why it should not be regulated by the commission.

Price of gas sold by Interstate to utilities in cities, for resale to private consumers, is regulated by the Federal Power Commission. FPC has no control over gas sold directly to industrial users.

The decision affects 11 customers who buy gas from Interstate, mainly for industrial purposes.

Interstate appealed to the Supreme Court after the PUC had ruled that the company was a public utility and that its direct sales could be regulated by the state commission.

•

**Taylor Drilling Co., Lewistown, Mont., and Great Northern Drilling Co., Billings, Mont., have merged.**

Great Northern acquires four rotary rigs, all rolling stock, and other assets of Taylor Drilling. This brings to eight the number of rotaries controlled by Great Northern.

Taylor was the first permanent rotary drilling contractor in Montana. Ike W. Taylor, president of the company, becomes chairman of the board of Great Northern.

•

**Log data and other well information will be made available to the**

## Canada Revises Far North Regulations

**Canada has revised its northern territories oil and gas leasing regulations, and extended them to include the Arctic Islands and Arctic continental shelf.**

The new rules provide that the Minister of Northern Affairs & National Resources must be satisfied of a company's Canadian registry or control before he can issue a permit for exploration in the territories.

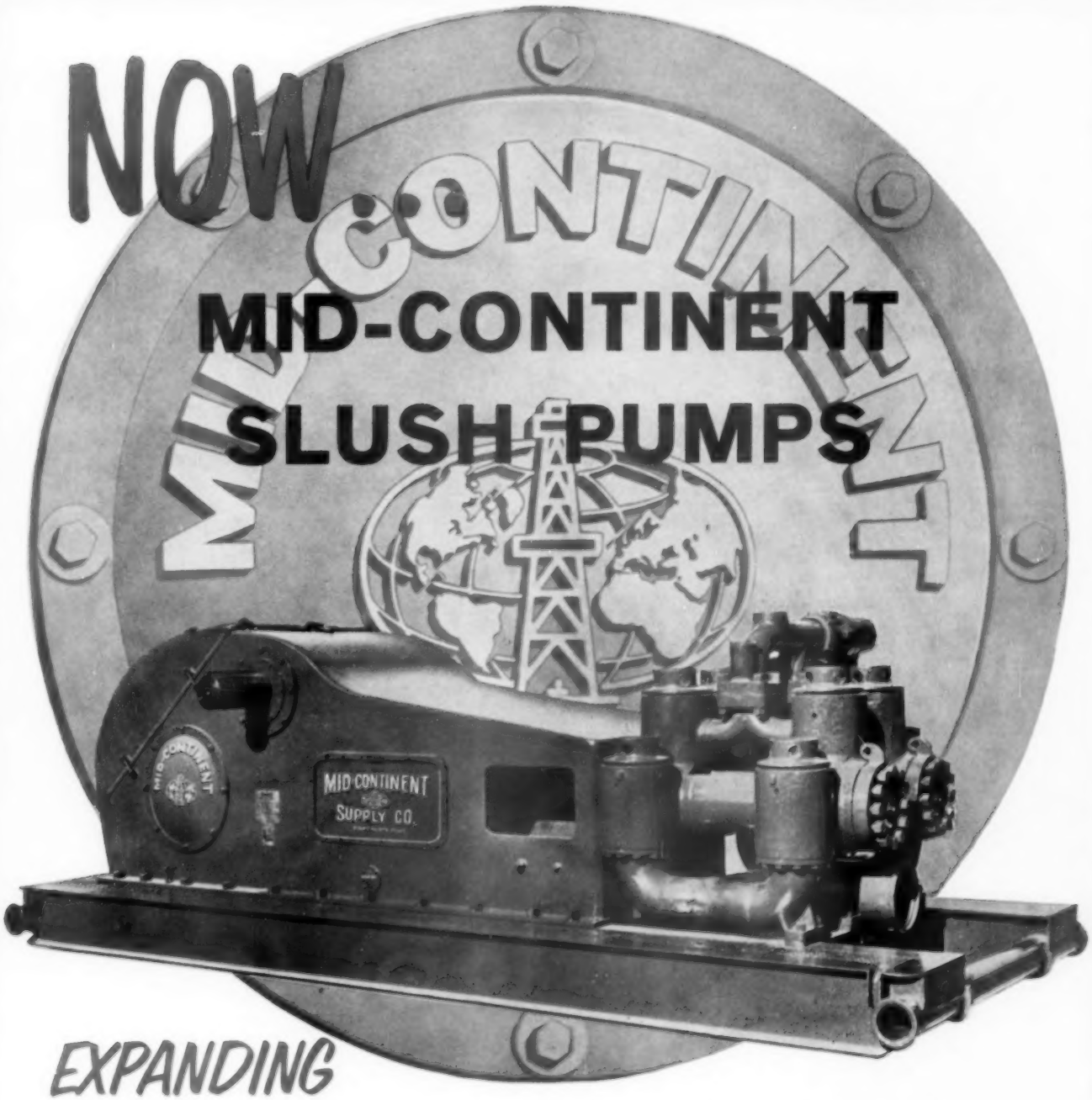
Leases won't be granted to anyone except Canadian citizens, or companies registered in Canada, or companies owned at least 50% by Canadian stockholders.

These ownership rules won't apply to present holders of permits on the mainland part of the northern territories. Several companies have been exploring there under informal arrangements that grant them a priority for permits when permits become available.

**One of the new rules extends the present provision for 9-year exploration permits to 12-year permits.**

In addition, the rules provide that leases may not be transferred except to companies that otherwise qualify under regulations.

# NOW MID-CONTINENT SLUSH PUMPS




## EXPANDING
## the Mid-Continent Line of Drilling Machinery

Since 1938, Mid-Continent Supply Co. has pioneered and field-proved the Emsco Pump throughout the oil fields of the world. Mid-Continent now proudly places its familiar world and derrick emblem on this series of pumps which includes models from 125 to 1000 horsepower capacity. These pumps and parts are 100% interchangeable with the Emsco line. And, Mid-Continent backs these pumps with fast, dependable field service from strategically-located parts and service centers. Call your local Mid-Continent representative today for assistance in selecting a Mid-Continent-Emsco Pump or parts for your drilling requirements.

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# "We have Ford Trucks with 101,090 to 146,436 off-road miles and no major repairs"

*says Mr. M. C. Kelsey*
*President*
*Rayflex Exploration Co.*
*Dallas, Texas*

"Doing seismic work for the petroleum companies in their search for new oil fields takes our crews far from any road. Our trucks must follow a line cross-country, regardless of the terrain. And Ford Trucks come through where the others won't.

"We have 46 Ford Trucks from pickups to heavies. The Ford Pickups are used as survey trucks and personnel carriers . . . two-tonners are shooting trucks, recording units and drilling trucks . . . the Ford F-800 Heavies carry an HD 1000 combination air-and-water drill.

The Rayflex Exploration Co. of Dallas serves the petroleum industry throughout the United States from Canada to the Gulf, and operates overseas as well. At the present time it has seven crews in the field.

The trucks shown *(above)* are two of the company's Ford F-600's equipped with HD V-8 engine, 4-speed transmission, 2-speed rear axle, special grille guard, winch and non-spin rear axle.

"All our Ford Trucks have proven their durability and operating economy. For example, truck No. 151 (1952 F-100) has 146,436 rugged miles and the engine has never had a complete overhaul—just new rings and a valve job. Last year it operated at a cost of only 4½ cents per mile. Truck R-20C (1956 F-800) has 101,090 miles without major repairs. It has run for 7⅓ cents per mile. These cost figures include all gas, oil, maintenance and repairs.

"We have all Ford Trucks except for our 4 x 4 pickups, and now that Ford builds this type of unit we'll probably be 100% Ford in the future."

# *Again in '60*
# FORD TRUCKS
# *offer Certified Savings!*

CERTIFIED FORD TRUCKS 1960 PROOF

## CERTIFIED ECONOMY . . .

Yes, this year, if you buy a Ford Truck, you get a truck with certified economy in the three major expense items: gasoline, tires and initial price.

**Best Gas Mileage!** Results of second running of Economy Showdown U.S.A., show 1960 Ford ½-ton Pickups won every test—beat the average of other four leading makes by 13.1%.

**Double Tire Life!** Under average conditions, Ford's truck-type suspension gives double the front tire life of that obtained with "soft-type" independent suspension used on some 1960 trucks.

**Lowest Prices!*** New 1960 Ford ½-tonners are priced from $33 to $181 below those of leading competitive makes. List prices of all Ford Light and Medium Duty models are lowest in their class.

## CERTIFIED DURABILITY . . .

The refinements built into the '60 Ford Heavy and Super Duty Trucks for longer life and greater reliability will also bring savings to your operation.

**Automatic Radiator Shutters,** standard on all Super Duty models, add considerably to engine life. Reduction of coolant temperature variations from a 79° range to a 20° range means less expansion and contraction, more efficient combustion and better lubrication.

**Dynamometer Tests** of Ford's submerged-type electric fuel pump showed no vapor lock at temperatures up to 200° F. Incipient vapor lock with mechanical fuel pump resulted in a 9% power loss under the same conditions.

**Shaker Table Tests** plus constant exposure to oil, water and heat proved Ford's 1960 wiring harness to be three times longer lived than the 1959 harness.

## CERTIFIED ECONOMY REPORTS . . .

Certified results of these and other tests conducted by America's leading automotive research organization, plus a comparison of manufacturers' suggested list prices, are now available at your Ford Dealer's. Take him up on his offer to check the records . . . see and drive the new Ford Trucks . . . *and you'll save for sure!*

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Milwhite Drilling Benefits: New Products, More Research, Comprehensive Communications, Highly Trained Engineers, a new Stockpoint Building Program and a Real Mud Service the industry has needed for a long time.

MILWHITE

MUD SALES COMPANY

HOUSTON, TEXAS

DIVISION OF MISSISSIPPI RIVER FUEL CORPORATION

**petroleum industry on a membership basis by a nonprofit group formed in Oklahoma City.**

Oklahoma Well Information Service, Inc., has been set up by oil company representatives, independents, geological consultants, and engineers.

•

**There are 6,694 oil producers and 2,844 gas producers in Texas, according to the new Oil Directory of Texas.**

The directory, published by R. W. Byram & Co., Austin, also notes that there are 157 oil and 308 gas purchasing and transporting companies and 70 refineries.

•

**Three applicants of a total of 1,557 have been awarded oil and gas leases on federal lands 60 mi. southwest of Montrose, Colo.**

The leases were awarded by the Bureau of Land Management by drawing names from all those applying

Those drawn were Carmack Drilling Co., Denver, 2,560 acres; Kenneth I. Jones, Cheyenne, Wyo., 1,800 acres; and Mrs. N. F. Kenyon, Cheyenne, 760 acres.

•

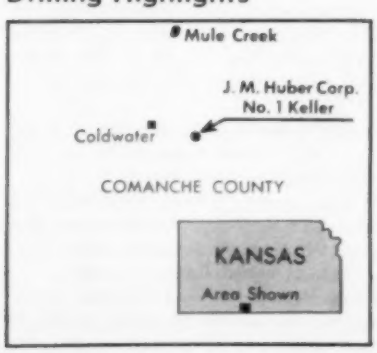
## Engineering

**A hydraulic winch that combines constant load, constant speed, constant torque, and constant horsepower has been developed by Braden Winch Division of Motor Products Corp.,** Broken Arrow, Okla.

The company says the basis for the new cable-handling system is the separation of the power and storage functions of the winch, usually combined in a single drum. In the CL Winch, two power drums do the pulling, while a large-capacity storage drum takes up the cable.

•

## Drilling Highlights




**Kansas**—J. M. Huber Corp. No. 1 Keller, section 22-32s-18w, Comanche County, flowed oil at a rate of 30 to 40 bbl. per hour on drillstem test at 5,642-95 ft. in the Viola lime. On previous 1-hour test at 5,600-42 ft., gas flowed at the rate of 8-million cf/d with a spray of oil. Earlier drillstem test in the Mississippian yielded oil and gas shows also. The wildcat is almost 10 mi. southeast of Mule Creek field. Operator at last report was drilling toward a planned target depth of 6,000 ft. It is on a farmout from Pure Oil Co.

**New Mexico**—Sun Oil Co. No. 1 M. J. McNulty, section 3-9s-34e, Lea County, was completed for 207 b/d of 47.6-gravity oil through 16/64-in. choke and perforations at 9,604-14 ft. in the Pennsylvanian. The discovery is 7 mi. west of Bough (Pennsylvanian) field.

**Nebraska**—Wyoming Western Oil Co. and U. S. Smelting, Refining & Mining Co. No. 1 Chamberlain, section 26-14n-58w, Kimball County, recovered 3,040 ft. of oil on 2-hour drillstem test at 7,174-79 ft. in the J sand. The discovery is 3 mi. south of production at an unnamed field in section 19-14n-57w.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**Permian Basin Oil Show**
**P. O. Box 2248**
**Odessa, Texas**

# Current Upswing in Exploratory Work

- **The decade of the '60s promises to be one of the most challenging in oil-finding history. Changing concepts point to drastic changes by 1970.**
- **Look for an increasing emphasis on basic research and more reliance on the "earth scientist" in an upgraded geological and geophysical profession.**
- **Competition between U.S. and foreign crews will increase overseas. But there's still plenty of opportunity for exploratory crews in domestic work.**

**The immediate future for domestic oil and gas exploratory work, while something less than rosy, is looking up for the first time in several years.**

Figures for 1959, just released by the Geophysical Activity Committee of the Society of Exploration Geophysicists, show an increase of 0.6% in the number of seismic crew-months over 1958 (table, page 42).

While this increase is admittedly picayune, it does nevertheless signify a reversal of a downtrend which has been interrupted only once before since 1953—in 1955, when the number of crew-months increased by 3.3% over the previous year.

Homer G. Patrick, chief geophysicist of the Humble division of Humble Oil & Refining Co., and for the past several years chairman of SEG's Geophysical Activity Committee, reports: "In 1952 (the peak year for domestic geophysical activity) the U.S. petroleum industry did 7,958 crew-months of seismic work. In 1958, seismic activity in this country amounted to 5,064 crew-months, a decline of approximately 36% compared to 1952.

"It should be mentioned, however, that due to improved techniques and instrumentation, and increased operating efficiency by the field crews, the reduction in total effective seismic effort was somewhat less than 36%."

After noting that the downtrend in geophysical work apparently leveled off in 1959, Patrick adds: "Actually, a slight increase (33 crew-months) over the previous year in seismic work was reported. Gravity meter exploration continued to deline, but this is not considered to be an indication of the trend in over-all geophysical work."

**Several trends and developments point to renewed strength in exploration work.**

- Several geophysical contract companies told PETROLEUM WEEK that they have been putting idle crews back in the field since the first of the year. These reports are borne out by major companies, some of whom have added as many as ten crews in recent months.
- PETROLEUM WEEK's survey of the industry found no companies planning significant cutbacks in 1960, but did uncover many whose budgets showed increases of 1% to 5%.
- Heavy expenditures by many companies for offshore acreage (PW—Mar.4'60,p20) will, in almost every instance, be plus values in their exploration budgets. These expenditures are being added to previously planned outlays for exploration work.

**In the coming decade, however, domestic exploration will be increasingly influenced by worldwide operations.**

Wilton E. Scott, senior vice-president of Tennessee Gas & Oil Co., says most companies would prefer to look for oil in the U.S. and Canada. "There are many places yet to explore for oil here," he says. "While we, like many others, are exploring for oil in foreign countries, we will be active domestically."

Gardiner Symonds, board chairman and president of Tennessee Gas Transmission Co., parent of Tennessee Gas & Oil, announced last month that the company will extend its exploratory activities in Africa—in Nigeria and in Spanish Sahara. A new division, Tennessee Overseas Co., has been set up to carry on foreign operations.

Humble's Patrick adds: "There are many potential producing areas in this country that are relatively unexplored, and much oil and gas remains to be discovered in the older producing areas."

**Exploration policies of U.S. companies abroad will be influenced, for the next few years at least, by politics and markets.**

Tom O. Hall, president of General Geophysical Co. and president of the Society of Exploration Geophysicists, says: "There is lack of interest in some foreign areas, but only in those which do not offer promising results from the standpoint of exploration, and in those where the political atmosphere is not favorable to obtaining worthwhile concessions.

"Argentina, North and West Africa, and parts of the Middle East continue to offer much of interest to oil companies attempting to establish foreign reserves."

In the year ahead, some experts believe, there will be a levelling off, or decline, in some of the older areas. But this will be offset, at least in part, by expanded exploratory work in new areas, such as those listed by Hall.

For example, Phillips Petroleum Co., a relative newcomer on the foreign scene, reportedly plans nearly to double its foreign exploration expenditures this year over

# Points to Better Years Ahead

1959. This, the company says, "is due to the broadening scope of the company's international operations in South America, Central America, Canada, Australia, Africa, Spain, Jordan, and the Kuwait-Saudi Arabia Neutral Zone."

Tidewater Oil Co., as operator in a joint venture with Standard Oil Co. (Ohio), announced plans last month for immediate exploration on some 5-million acres in the Spanish Sahara. And just a few weeks ago, Socony Mobil Oil Co. also announced plans to expand exploration in North Africa.

The French Sahara, Argentina, Spain, and Australia also are attracting American companies in increasing numbers.

In other areas, however, oil companies seem to be pulling in their horns. Witness the fact that only one seismic crew remains in Venezuela, a country where the economic returns to operators have been sharply diminished. A scant two years ago there were 250 seismic crew-months chalked up in that country.

**There already is growing competition between U.S. and European geophysical companies, and between U.S. and foreign exploration crews, in some overseas areas.**

"European exploration companies enjoy a decided tax advantage in some areas," says one expert. "An even more ominous threat is the willingness of the Soviet government to underwrite the entire expense of Russian exploration teams [under deals with foreign governments]. This is happening in India, Syria, and parts of Africa right now.

"In some foreign areas, U.S. geophysical companies have been forced to team up with European companies just to get their foot in the door."

**All in all, though, one point seems clear: The long-range outlook for earth scientists in oil exploration has seldom, if ever, been better.**

Ben H. Parker, vice-president of Frontier Refining Co. and president-elect of the American Assn. of Petroleum Geologists, says:

"A century of petroleum industry experience has clearly demonstrated that although new reserves can be, and often are, discovered by random drilling, over-all and long-range economic success in petroleum exploration must rest on a foundation of applied geology.

"In view of this truism, it appears axiomatic that industry and mankind will continue to need the application of geology to petroleum exploration, at least as long as petroleum and natural gas can provide desirable fuels in competition with other energy sources. My opinion is that, compared with today, more rather than fewer geologists will be needed in petroleum exploration and development during the next 25 years."

Paul L. Lyons, chief geophysicist of Sinclair Oil & Gas Co. and former president of SEG, adds: "I would project a continued leveling off or decline for geophysical activity, with some ups and downs, until about 1964. By that time, a pinch in reserves should begin to develop, and demand will increase more rapidly. By then, also, an increase in product prices should bring a spurt in exploration as all companies look to their reserves.

**continued ▸**

BLACK PLUME of earth shoots skyward in West Texas, illustrative of the new strength in domestic seismic activity.

"By the middle sixties, the increasing success ratio of geophysical work will make application of expert techniques very attractive. The last half of this decade should be a fair time for geophysical exploration as a stable business free of excesses."

## Research Will Be Stressed

**Perhaps the most encouraging aspect of the entire exploration picture is the trend toward more research.**

Says Humble's Patrick: "In spite of the reduction in exploration, we have seen little decline in geophysical research. The oil companies, the geophysical contract companies, and some of the universities are continuing their research efforts. From them we can expect new technological developments.

"The oil companies can and should carry on a certain amount of basic research along with their applied research programs. In general, the geophysical contract companies cannot be expected to engage in anything other than applied research, although some of them may support basic research projects by the universities."

Hall, Lyons, and others agree that more basic research is definitely needed in geophysics.

**Expanded research programs in this decade unquestionably will bring the development of new tools and techniques which will either: (1) do the job better; or (2) offer greater economy.**

The manager of one major-company exploration department says: "It's only a matter of time until we come up with a reliable method of direct oil detection."

Not too long ago, such a statement by a responsible research scientist would have been termed nonsense or worse, in many quarters.

But, says Sinclair's Lyons, "the technological development that would most alter current geophysical concepts would be a direct method of finding oil. The possibility of its discovery is somewhat remote, but entirely possible, and it should enter into any speculations as to the future of oil exploration."

**Current research efforts may indicate the paths that exploratory trends will follow in the next ten years.**

At least three major companies have in recent months evaluated surface electrical methods of oil detection. These and other companies also are going further into geochemical research—attempting to locate oil and gas accumulations through analysis of soil and surface bacteria, and detection of characteristic elements.

New theories also are taking root in geology. A. I. Levorsen, Tulsa geologist, predicts, "Hydrodynamics applied to stratigraphic traps will be one of the concepts which will most occupy petroleum geologists during this decade."

Maurice Ewing, director of Columbia University's Lamont Geological Observatory, says: "I can foresee important technological developments which may radically alter current geophysical concepts. Electronic data processing and methods of data presentation are examples."

**Some unique approaches to the over-all problem of finding oil are being applied.**

An example is the "Exploration Study Group" formed about a year ago by Tennessee Gas & Oil. Composed by highly trained earth scientists, the group applies the collective talents of its members to special problem areas when specifically requested to do so by field personnel. "The need for these special talents is so great," says vice-president Scott, "that, when the group was formed, there were so many requests for help from the field that it will take five years to complete the work."

Scott adds that the study group also helps in the company's effort to upgrade ability of personnel at the district level, which is the working level.

**continued ▸**

### Geophysical Crew-Months—1959 (United States)

| | Seismic Co. | Seismic Cont. | Gravity Co. | Gravity Cont. | Magnetic Co. | Magnetic Cont. | Total |
|---|---|---|---|---|---|---|---|
| Texas | 692 | 1019 | 67 | 82 | 12 | 16 | 1888 |
| Louisiana | 379 | 550 | 35 | 33 | — | — | 997 |
| New Mexico | 183 | 140 | 42 | 34 | 12 | — | 411 |
| California | 19 | 97 | — | 20 | — | — | 136 |
| Wyoming | 173 | 127 | 1 | 21 | — | — | 332 |
| Colorado | 90 | 36 | 3 | 14 | — | — | 143 |
| Montana | 75 | 82 | 6 | 3 | — | — | 166 |
| Florida | 42 | — | 3 | — | — | — | 45 |
| Utah | 74 | 70 | — | 18 | — | — | 162 |
| Oklahoma | 144 | 164 | — | — | — | — | 308 |
| North Dakota | 52 | 38 | — | 5 | — | — | 95 |
| Mississippi | 234 | 203 | 33 | 21 | — | — | 491 |
| Kansas | 62 | 59 | 12 | — | 11 | — | 144 |
| Arkansas | 38 | 26 | — | — | — | — | 64 |
| Arizona | 2 | 24 | — | — | — | — | 26 |
| Alaska | 15 | 82 | 3 | 7 | — | — | 107 |
| Alabama | 6 | 21 | 15 | 5 | — | — | 47 |
| Other | 9 | 70 | 23 | 42 | — | — | 144 |
| | 2,289 | 2,808 | 243 | 305 | 35 | 16 | 5,696 |
| **Total** | **5,097** | | **548** | | **51** | | **5,696** |
| 1958 | 5,064 | | 612 | | 55 | | 5,731 |
| 1957 | 6,283 | | 879 | | 80 | | 7,242 |
| 1956 | 6,813 | | 998 | | 45 | | 7,857 |
| 1955 | 7,090 | | 1,074 | | 76 | | 8,240 |

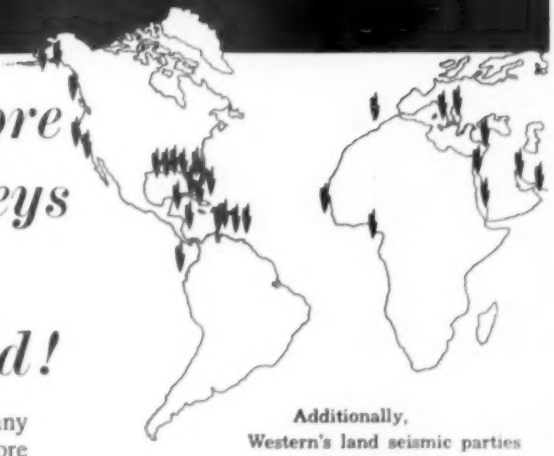
### Geophysical Crew Months—1959 (Canada)

| | Seismic Co. | Seismic Cont. | Gravity Co. | Gravity Cont. | Magnetic Co. | Magnetic Cont. | Total |
|---|---|---|---|---|---|---|---|
| Alberta | 226 | 323 | — | 5 | — | — | 554 |
| Saskatchewan | 54 | 34 | — | 1 | — | — | 89 |
| British Columbia | 25 | 96 | — | 3 | — | — | 124 |
| N.W. Territories | 1 | 29 | 2 | 5 | — | — | 37 |
| Manitoba | 6 | — | — | — | — | — | 6 |
| Ontario | — | — | — | 15 | — | — | 18* |
| Nova Scotia | — | 2 | — | 6 | — | 1 | 9 |
| New Brunswick | — | — | — | 4 | — | — | 4 |
| | 312 | 484 | 2 | 39 | — | 1 | 841* |
| **Total** | **796** | | **41** | | **1** | | **841*** |
| 1958 | 1,065 | | 65 | | — | | 1,130 |
| 1957 | 1,308 | | 81 | | — | | 1,389 |
| 1956 | 1,423 | | 88 | | — | | 1,512 |
| 1955 | 1,496 | | 103 | | — | | 1,599 |

*Includes three (3) "other" in Ontario
Source: Society of Exploration Geophysicists

**GEOPHYSICAL STATISTICS** compare company and contractor crews, show first hike in five years in U.S. seismic work.

# *Western Conducts More Marine Seismic Surveys Than All Other Contractors Combined!*



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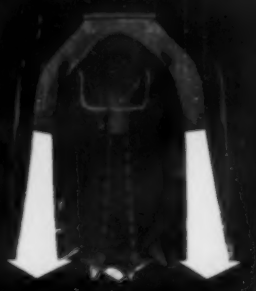

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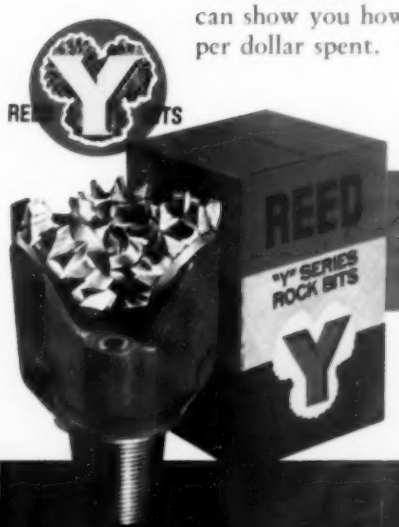


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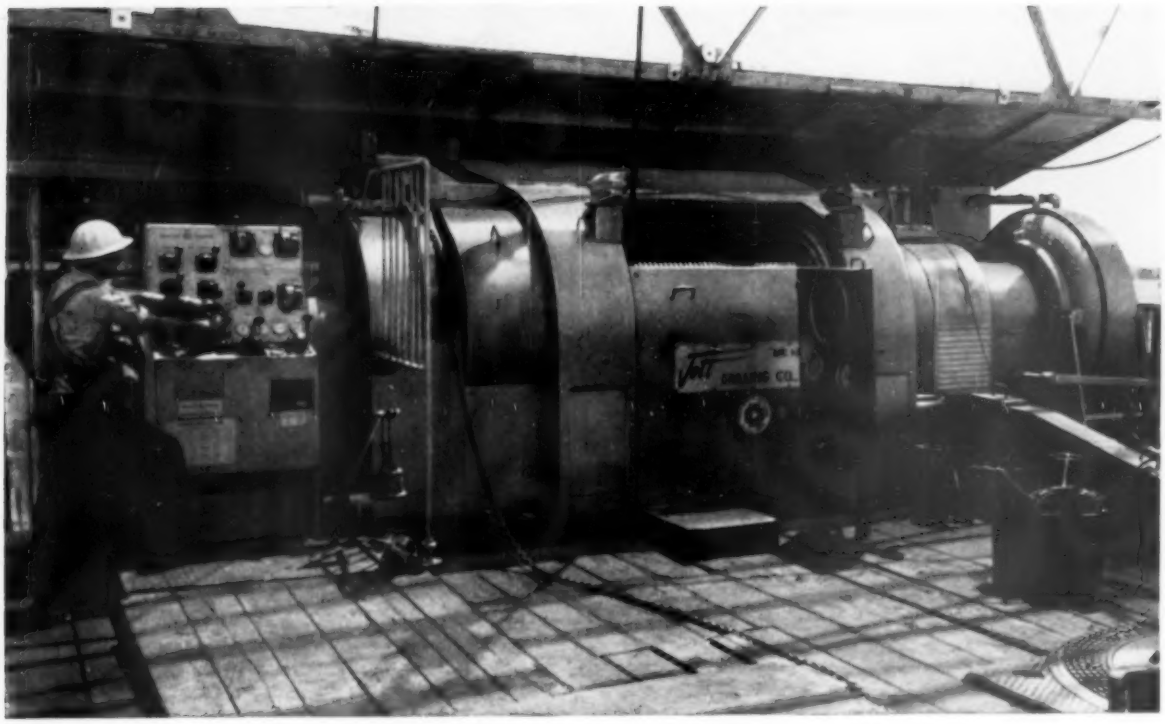

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COMPUTERS, such as this new IBM 1620 data-processing system, are playing an increasing role in exploratory programs.

## Bigger Role for Computers

**Of all the trends now evident in petroleum exploratory work, few, if any, will have greater ultimate effect on the detection of hydrocarbon deposits than the conversion of field data to digital form and its subsequent processing by electronic computers.**

Although use of computers is one of the most recent interpretational aids to the nation's oil finders, it already exceeds all specialized studies. Some jobs being done with the aid of computers are log and core analyses and correlation, seismogram synthesis, seismic velocity determinations, gravity and magnetic determinations, seismic migration and normal move-out charts, and seismogram trace analyses.

International Business Machines Corp. alone estimates that about 100 of its computers, mostly 650s, are being used by the oil industry for exploration-production problems.

**Computer manufacturers, recognizing the growing use of their machines for exploration purposes, are contributing their own developments to increase efficiency of computer use.**

Late last year, IBM announced the availability of six geophysical and two geological "package" programs which it supplies on request, without charge. All were developed by individual companies, which have made them available to the industry through IBM (PW—Oct.23'59,p22).

IBM also introduced recently two new machines, which it designed especially to meet the growing needs of exploration and production people. One is the IBM 1401, a high-speed printer-plotter that will be available for delivery next fall. The other is the IBM 1620 medium-sized computer, brought out last November. Specially designed for field locations, it uses punched tape rather than cards—making storage and use easier when facilities of central computer centers are not available.

And just last month, Bendix Computer Division of Bendix Aviation Corp. unveiled a large-scale, high-speed electronic data-processing system, called the G-20, which is applicable to a wide range of oil-industry uses, including reservoir analyses. The compact system, which is comparatively inexpensive, has the ability to solve problems at high speed, since it is capable of 45,000 floating-point operations per second.

**Indicative of the increasing importance of computers in exploratory work is the program outlined by Sunray Mid-Continent Oil Co.**

Sunray has had the medium-size IBM 650 and the IBM 407 plotter-printer in service for the past two years. Currently, exploration applications account for little more than six machine hours per month, but the company expects this time to increase to 40 hours per month by 1963.

In addition to work done on the company-operated 650, Sunray has made it a practice to farm out to consultant groups a large amount of its exploration computer work. A large portion of this has been a complete revaluation of the company's magnetic and gravity work, some of which goes back nearly two decades.

**Sunray also uses its computer to construct seismic time-depth charts from velocity surveys.**

Working with corrected times and depths, Sunray's computer technicians set up the program. The resulting curve, computed by the 650 and plotted by the 407, gives values from which the time-depth chart is made for each prospect. Depending on depth, this program requires approximately one hour of machine time.

H. O. Harder, senior vice-president directing Sunray's exploration activities, says the machine has a tendency to "smooth out" the time-depth curves too much. This condition is aggravated, he adds, in areas where velocities decrease, rather than increase, below certain depths.

**Electronic computers may see their widest application during the decade in the field of well log analyses and correlation.**

The chief log analyst for a major company says: "One of the problems which ultimately must be solved is the

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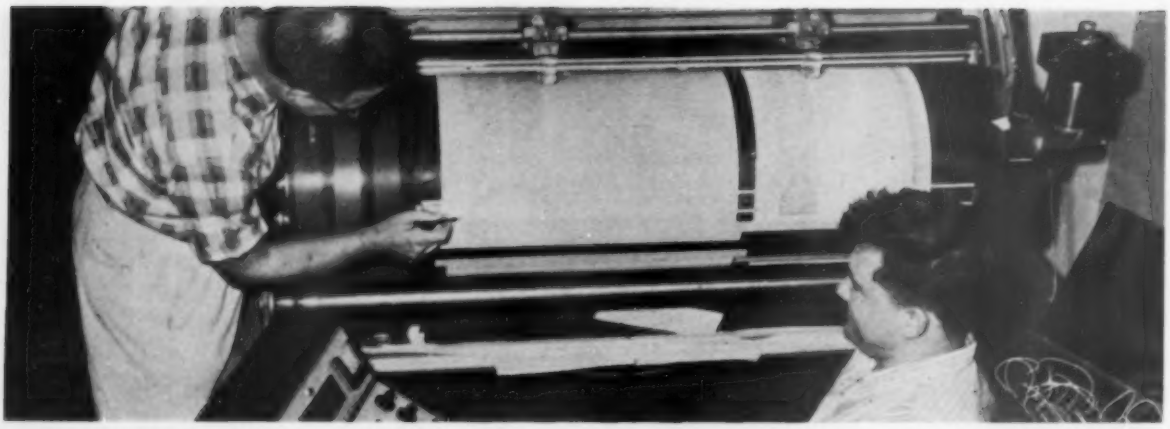

**PORTABLE PLAYBACK UNIT developed by Atlantic Refining Co. is now used by six of the company's seismic field crews.**

present inability of the log analyst to cope with the vast amount of information now available from logs. In a 10,000-ft. hole, for example, we may look at less than 1,000 ft. of log. The remainder, for practical purposes, is wasted.

"Our one salvation is the possibility of putting logs on tape and using computing machines to study and interpret the data. So far, there has been no extensive application of this approach, though I know from talking with our own research people that investigations are being made by ourselves and several other companies.

"To my knowledge, no electric well logs are at present being recorded on tape in the field. This will have to come before extensive electronic computation of log data will be practical—unless someone comes up with an extremely rapid and inexpensive method of converting existing well logs to tape."

**One approach to the problem of converting existing well logs to digital form as a prelude to electronic data processing was announced recently by Birdwell Division of Seismograph Service Corp.**

"As a step toward automation of log analysis and more efficient use of the huge quantities of logs available to the industry," says Birdwell's sales manager, Lloyd Fons, "we are offering a Log Digitizing Service which will convert any present log curve to digital form."

The Birdwell process involves the making of a binary coded punched tape that is suitable for direct introduction into Bendix computers. In a separate operation, the punched tape can then be translated to IBM cards or to tabulation sheets.

Birdwell's digitizing system uses a drum over which the electric well record is passed. It is somewhat similar in application to the Seisverter, which the parent SSC introduced in 1957 (PW—Nov.15'57,p33) for transferring seismic data from conventional wiggle-trace records to magnetic tape (picture, page 56).

Tracking of the log curve, which at present requires the constant attention of a highly skilled operator, proceeds from the bottom of the record upward. All or any part of the log may be transcribed on tape, as switches are regulated to punch in the starting depth.

Birdwell currently is examining the possibility of automatic tracking (tracing) devices which would eliminate the need for any manual effort once the digitizing process starts. Only a little farther down the road, Birdwell believes, is simultaneous pen (analog) and tape (digital) recording in the field. This method, which could use magnetic or punched tape equally well, would provide an immediate visual curve in the field, plus a means of going directly to electronic data processing in the laboratory.

**Century Geophysical Co. of Canada, a subsidiary of Century Geophysical Co., Tulsa, has recently begun offering simultaneous digital and analog recording of its Acoustic log.**

The system employs digital recording equipment mounted in the field unit. The electrical signal being fed to the recording galvanometers is digitized directly to produce the digital log on punched tape. The tape is punched on command from a signal obtained at each foot of depth from a depth counter.

The format from the tape is compatible with the input of a Royal McBee LPG 30 computer. A binary coded decimal form is used, in which four digits are punched for each reading. Since readings are sequential, no depth count is recorded.

To satisfy everyone that their digital recording is accurate, says Century supervisor J. L. Poole, the company manually plots data from the tape and compares the resultant curve to the field analog recording.

Poole told PETROLEUM WEEK that the method has been used recently in Alberta and British Columbia. He also disclosed that the parent company will introduce the service in the U.S. this spring.

**In the reduction of its digital data for geophysical purposes, Century of Canada uses a computer program which first stores seismic check shot data.**

Following this, the program introduces a running integration of the log data to check shot levels, and a comparison is made against check shot times. If an error exists, it is evenly distributed over the interval between check shots, and a reintegration made to force-fit the data to the check shot levels.

Average velocity and interval velocity are then calculated, and a tabular print of this data made for each 10 ft. of depth and at each geophone level.

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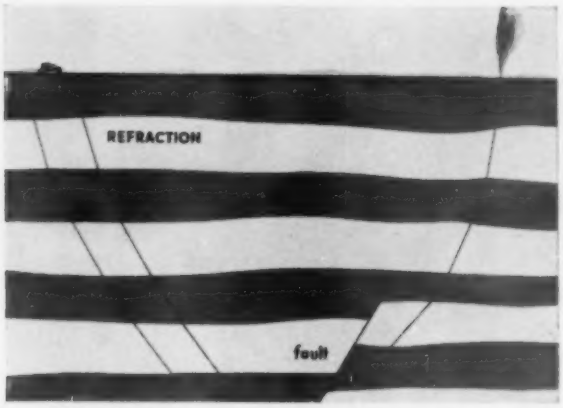
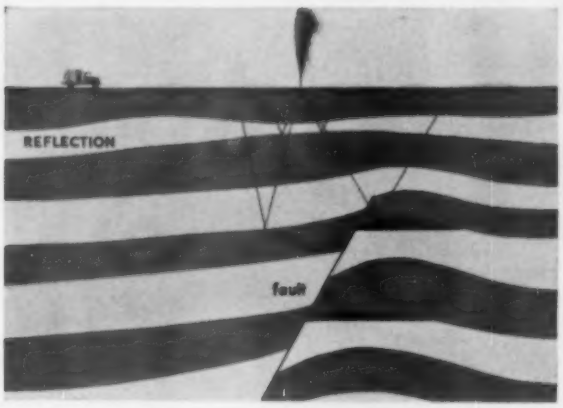



**REFRACTION shooting, shown in stylized schematic, is having another revival, especially in "bad-record" areas.**




**REFLECTION shooting, improved by new tools and techniques, is still the predominant method used by seismic crews.**

## Trends in Seismic Techniques

**Another significant trend currently influencing geophysical thinking is a resurgence of the old refraction shooting technique.**

Refraction work owes its rebirth to two general types of areas: (1) unevaluated basins where the method is being used for reconnaissance purposes; and (2) older areas, where records obtained with reflection shooting are not wholly satisfactory.

Falling in the first category are such areas as Brazil and western Australia, where refraction crews are going ahead of more comprehensive seismic surveys likely to be conducted later. In such areas, where many concessions are as large as entire states in the U.S., the problem is one of covering as much ground as possible as rapidly as possible with the least expenditure of exploration funds.

Currently active "bad-record" areas include the sedimentary basins of Iraq and Iran, and the Delaware and Val Verde Basins of West Texas.

While reasons for "bad record" country vary, geophysicists have found that many trouble spots can be effectively combatted with the refraction seismograph.

**The current refraction seismograph revival has steadily gained impetus over the past ten months.**

The history of refraction work in the U.S. has been one of high peaks and deep valleys since 1924. There was a severe decline in the amount of refraction work following World War II, when vastly improved reflection techniques and instruments appeared.

The current upswing probably can be regarded as another temporary peak, but it is one likely to grow in relative importance for the next several years unless it is challenged by some drastic new concept of oil finding.

**Another growing seismic trend appears to be the use of weight-dropping techniques to replace conventional explosives as the signal source.**

Biggest user of the method, Robert H. Ray Co., Houston, which last year merged with McCollum Exploration Co., currently has ten thumper-equipped crews in the U.S.—eight in West Texas and two in New Mexico. Overseas, Ray has five crews in Libya and another in Iraq.

Another contract firm, Independent Exploration Co., has three weight-dropping crews in action, and Humble Oil is using one weight-dropping device in West Texas, on an experimental basis, and another in Southwest Texas.

R. L. Palmer, vice-president of Robert H. Ray, says there have been some improvements in Ray's weight-dropping technique during the past year. One early disadvantage of the method, an inability to control weathering corrections, has been partially overcome through use of special refraction geophones.

**Another method that uses an unconventional energy source is a continuous signal seismograph which the originator, Continental Oil Co., calls the Vibroseis.**

According to Conoco engineers, the method employs a trailer-mounted "typical centrifugal vibrator, in which horizontal forces are canceled between the two properly phased eccentrics." Vibrational output is obtained by causing the direct-coupled vibrator shaft to sweep through the desired frequency band. Conoco says the method, still considered in its experimental stages, is limited as to depth of penetration and lacks weathering control. Its main advantage appears to be lower cost.

**Important recent advances have also been made in marine seismic methods. One of these is a system that employs a gas explosion as the source of energy.**

This method is akin to the "Sparker" (PW—Mar.13 '59,p54), except that it uses a repetitive gas explosion rather than an electric spark for its energy. Lamont Geological Observatory, which has used the method for academic purposes, refers to it as RASS, for Repeatable Acoustic Seismic Source. Socony Mobil Oil Co.'s Field Research Laboratory has also used a gas-explosion technique for exploratory purposes (PW—Jan.29'60,p23).

Lamont's experience has indicated penetrations in excess of 1,400 ft. in 80 ft. of water. The Sparker produces reflections from about 600 ft. in 50 ft. of water.

Mobil's researchers say they have produced records that consistently showed good reflections from depths of 4,000 to 5,000 ft., and in some cases from 8,000 ft. or more.

Detonation equipment, developed independently by Lamont and Mobil, is basically the same. Both use combustion chambers in which a mixture of propane and air, or propane, air, and oxygen, is ignited by an electric spark.

**continued ▸**

**INSTRUMENTED SLEDGE HAMMER is used to explore the earth structure to 50 ft. with this transistorized seismic timer.**

**GEOPAC UNIT, developed by General Geophysical Co., allows production of fully corrected seismic records in the field.**

Mobil's detonation "gun" is described as an iron tube, about 20 ft. long and 6 in. in diameter, which is supported over the side of a boat. Lamont's RASS is somewhat smaller, and is towed by electric cable through the water in a small paravane or torpedo. Mobil's device is fired at three-second intervals, with the open end of the tube submerged about 3 ft. below the water surface. Lamont's RASS is fired at intervals of one to two seconds at depths of 2 to 5 ft. below the water surface.

**The first commercial use of gas explosion concept is expected to be undertaken this spring in Canada's northern lakes by Accurate Exploration, Ltd.**

A. E. Pallister, Accurate's technical operations manager, says the technique "promises to be particularly useful in the North as a means of speeding up and cutting costs of reconnaissance exploration."

"Water normally is a problem," says Pallister, "but we try to take advantage of it. Between conventional marine seismic and the Sparker (or RASS), we can cover large areas rapidly at comparatively low cost by obviating the need for bulldozing and drilling"

Pallister estimates Far North seismic costs at $2,400 per mi. for conventional seismic land work; $1,200 per mi. for marine seismic; $600 per mi. for RASS, and $300 per mi. for the Sparker.

Pallister says costs of the RASS and Sparker methods may be cut even further by replacing the usual boat with a small, pontoon-equipped airplane.

**The problem of "singing records" in conventional marine seismic work may be cleared up through research work now being conducted by Western Geophysical Co.'s data-reduction center, at Los Angeles.**

This problem has long plagued overwater seismic surveys. In the past, Western's researchers have been successful in devising partial solutions for the problem in some areas. The technique now being explored, however, is expected to apply to most cases of "singing" records and to improve previous results. It involves a new means of removing undesirable frequencies without destroying record quality.

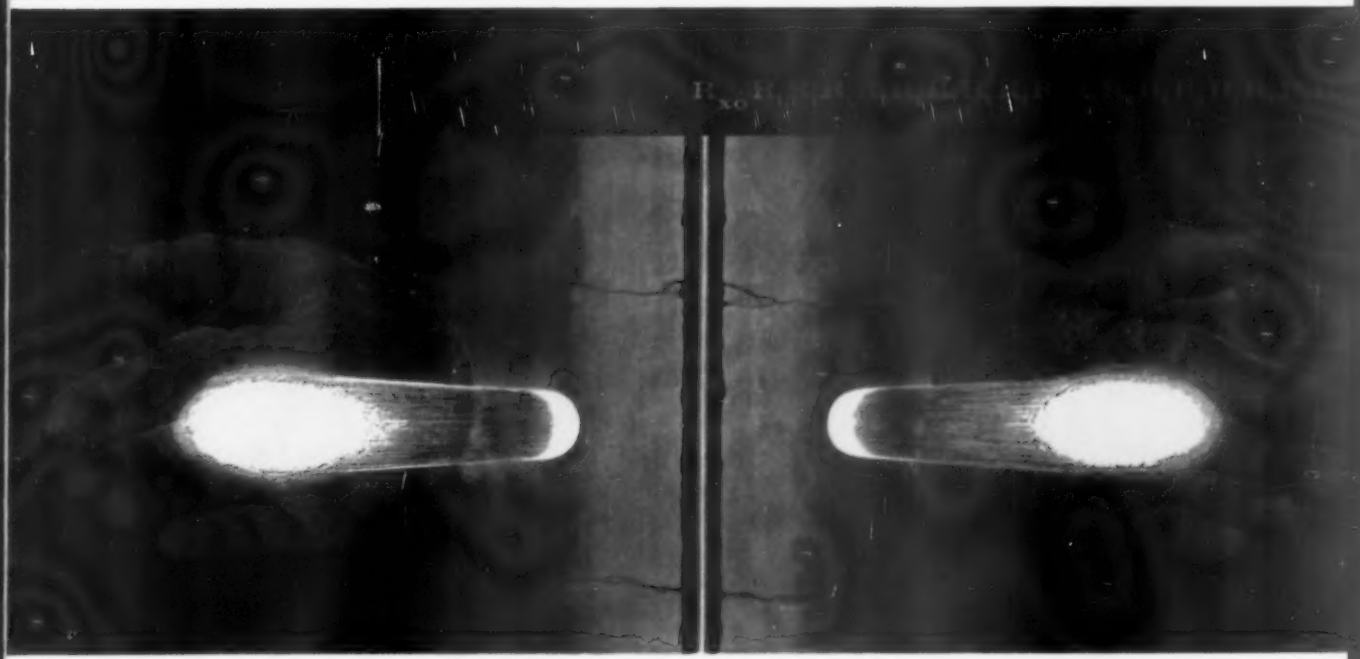
**GEODATA SYSTEM is used primarily for producing filtered and time-corrected seismic cross-sections.**

**Sinclair Research Laboratories, Inc., has developed a small, high-frequency seismograph, in line with efforts to miniaturize seismic equipment in order to make it more portable.**

**continued ▸**

*The New Schlumberger Deep Induction Log*

# *reaches twice as deep to give twice the contrast between water and oil*



Engineered to overcome deep invasion, the new Schlumberger Deep Induction Log retains all the advantages of the Induction-Electrical Log . . . symmetrical response, thin bed definition, detail for correlation, simultaneous recording with 16″ SN and SP . . . *plus* an investigation twice as deep which gives twice the contrast between water and oil.

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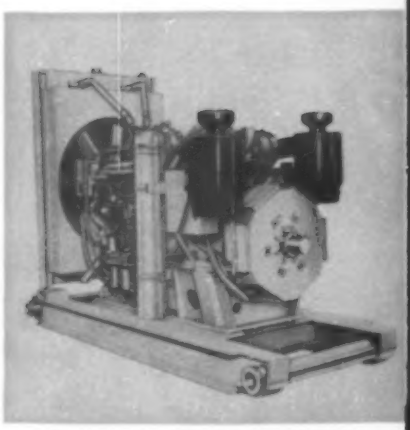

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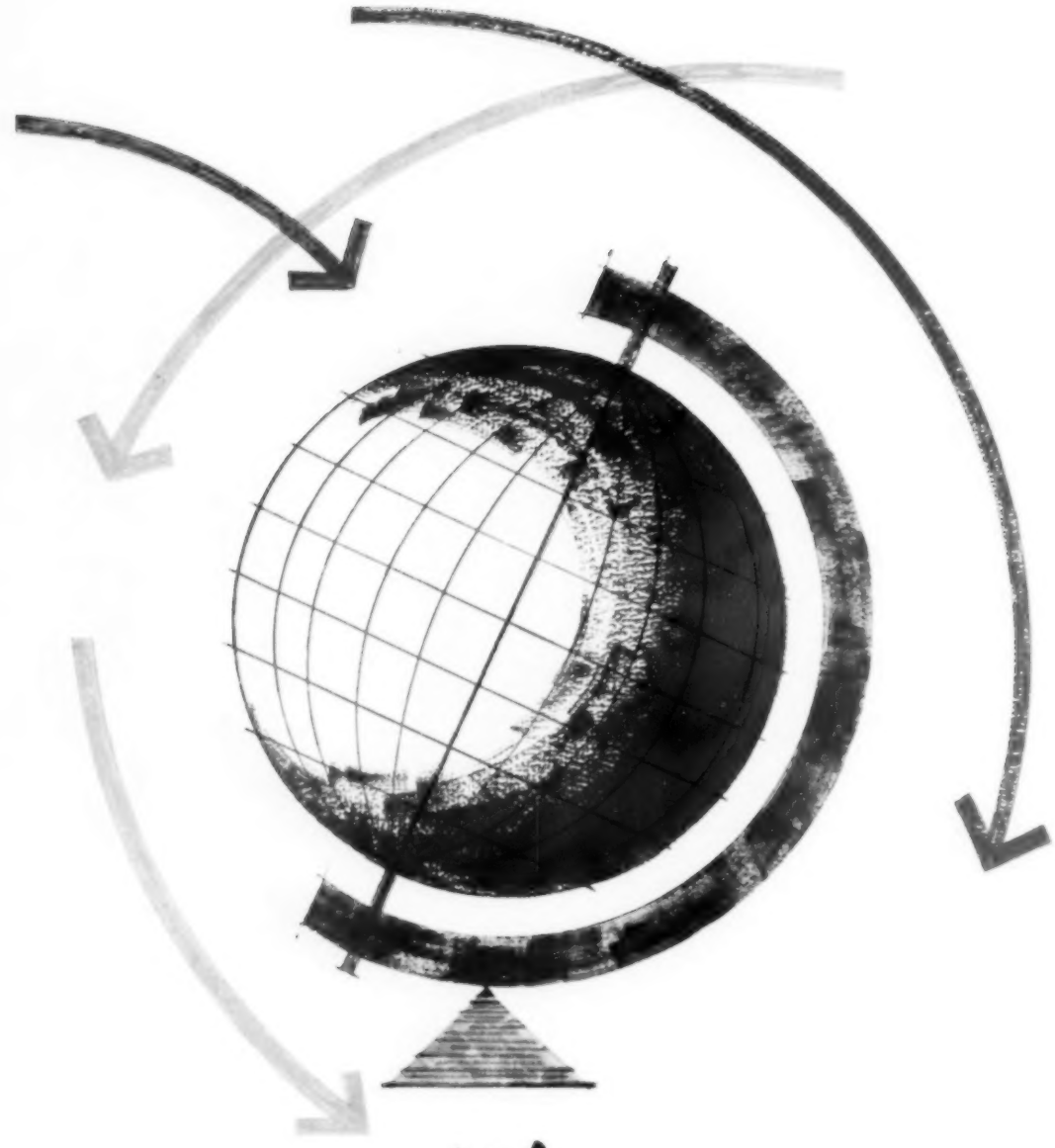

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The so-called "suitcase" seismograph will enable oil seekers to detect important clues previously overlooked in the "twilight" zone down to 2,000 ft., Sinclair scientists believe. The instrument can easily be carried by two men, with portable drills or hand augers used to drill shot holes. The unit's shallow reflection amplifier has 12 channels and 12 companion detectors on the seismometer spreads to pick up reflections.

**A somewhat similar device, patented recently by DynaMetric, Inc., Pasadena, Calif., can be used to determine seismic up-hole times in some areas.**

Called a "seismic timer" by DynaMetric, the device measures velocity of seismic shock waves directly in milliseconds. Thus, the operator does not have to convert his reading by adding binary number groups. The energy source is provided by sledge-hammer blows on a steel plate located a few feet from a geophone. The timer is lightweight, self-powered, and completely portable (picture, page 50).

The developer says the timer also can be used by geologists to determine dip and strike of outcropped, inclined strata and to locate near-surface fault lines and ancient stream beds. Maximum depth penetration is about 50 ft.

## More Aerial Exploration

**Possibly the most significant development in aerial exploration is the new technique of photogravity, a coined term which denotes a precise blending of photogeologic and gravimetric interpretation.**

The new concept is being offered presently by only one company, Photogravity Co., Inc., Houston. It is designed with three specific purposes in mind: (1) optimum placement of gravity stations; (2) elevation corrections consistent with surface outcrops; and (3) realistic terrain corrections.

"Coordination of gravity and photogeology can improve exploration efficiency by deliberately planning gravity traverses across observed photogeological features," says E. F. Haye, Photogravity president.

"In many past instances, gravity surveys have been conducted without regard to surface outcrops. Stations have been metered at equal intervals along roads simply for the sake of expediency. One reading may have been taken over dense shale, and the next over alluvial gravel, without correction being applied. It's no wonder some oil men have lost confidence in gravity surveys.

"A photogeologist, working with aerial photographs, can readily detect surface density changes and advise the field party of them in advance of station location. For accurate work, surveying and computations must be adjusted to correspond with these changes in surface lithology."

**The method by which Photogravity Co. carries out its surveys is a marked departure from the conventional gravity approach.**

First step in Photogravity's program is a careful inspection of aerial photographs by a trained photogeologist. The photographs are obtained from any one of many governmental agencies that have photographed the entire U.S., or from the client. Costs are nominal.

Following his inspection, the photogeologist consults with the field party chief, who then stakes the gravity stations on the prospect and spots their location on a control map.

AERIAL CAMERA has extremely wide-angle lens, and is fully automatic. It's used in photogeologic studies.

The party chief is followed by the surveyor, who normally carries elevations and horizontal distances with level or transit. Photogravity's geophysicists prefer to take horizontal control direct from aerial mosaics, using stadia as a check.

After readings are made by the instrument crew, field data is processed by electronic computers to allow greater versatility in interpretation.

Costs of such work are only slightly higher than surveys conducted by conventional gravity crews, says Haye, running 10% to 12% greater in rugged terrain and about 15% higher in level, sectionized country.

**Another significant addition to aerial exploration in recent months has been the Canadian-designed airborne gravity gradiometer.**

Developed in the Toronto research laboratory of Lundberg Explorations, Ltd., the device is reported to have undergone three years of intensive evaluation.

J. B. McClusky, engineer in charge of marketing the device, says it will be used in combination with the airborne magnetometer for oil exploration around the world.

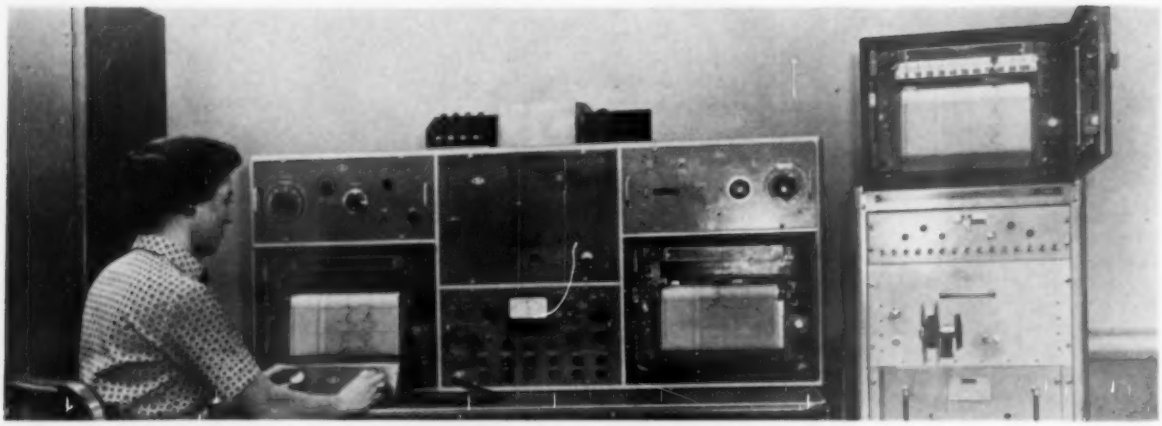
The gradiometer is guardedly described by its inventor as a "sensitive electric balance composed of two substantially similar masses suspended on thin filaments, one above the other." A variable condenser is located near the two masses.

When the instrument is flown over an anomaly, the masses change their position relationship, and the movement is measured electronically, "to a hundred-millionth of a centimeter."

So far, says McClusky, the gradiometer has been flown in South America, Africa, and Canada.

**Improved equipment is aiding greatly in a more pre-**

**continued ▸**



**WELL LOG DIGITIZER** makes possible the reproduction of analog well records on punched tape compatible with a computer.

**cise application of aerial photogrammetry geologic studies.**

The development of high-speed color film and special clear filters is making possible an increasing reliance on color photographs for geologic work.

Says one explorer: "Colors have proved much better than black-and-whites in picking outcrops, speeding up and improving locations of inclined beds, and determining strike and dip of exposed strata. The main value of photogeology is the speed with which a broad area can be covered, and color photography has greatly speeded interpretational ability."

**An extremely wide-angle, fully automatic aerial camera was introduced recently by Wild Heerbrugg Instruments, Inc., of Port Washington, N.Y.**

The camera, says K. E. Reynolds, executive vice-president, is one of the few currently available which contains a lens capable of 120-degree coverage (picture, page 55).

The camera also is capable of producing vertical photographs at precise scales from flight altitudes of 20,000 ft. to 25,000 ft. Residual distortion does not exceed plus or minus 0.05 mm., and even this can be eliminated, for subsequent stereoscopic work, together with the effects of earth curvature and atmospheric refraction.

The fully automatic camera, once correctly set and started, takes the serial pictures at intervals corresponding to the flying speed, the height above ground, and the required overlap.

**Airborne magnetometer work remains active.**

Aero Service Corp., of Philadelphia, right now is conducting one of the most comprehensive magnetometer surveys ever tried. Begun early this year on a speculative basis, Aero Service's Appalachian survey is scheduled to be completed in September.

Results of the survey, which covers approximately 121,500 sq. mi., will be offered to oil and gas companies at about 2¢ per sq. mi. Fred Navazio, administrator of Aero's Airborne Geophysics Division, says raw data produced so far "looks good."

Also scheduled to start soon is a survey of the Spanish Sahara. Aero Service will have as its primary objective evaluation of minerals. The company has a similar survey under way in Turkey and has just completed another in the interior of Dutch Guiana.

## Logging Tools Are Better

**In logging, the sonic (acoustic, velocity) log appears to be the hottest thing going.**

Schlumberger Well Surveying Corp. reports that its use of the sonic log increased 400% in 1959 over the previous year. Virtually every major logging company now offers its own version of the log.

There are good reasons for the sonic log's growing popularity. Says one major company log analyst: "Sonic logs provide us with the most accurate determination of reservoir porosity in many instances. In addition, they are very useful in lithologic determinations and, with further understanding, may even provide an excellent means of differentiating between formations containing gas and those containing fluid.

"On occasion, they can be used successfully to locate fractured zones. They exhibit excellent correlation characteristics and are not materially affected by the nature of the fluid in the borehole. Also, the sonic log is one of the most easily interpreted of any available log, and correlates nicely with resistivity and radioactivity logs."

There also is an increasing use of the sonic log for time-depth conversions of electric logs, and for the manufacture of synthetic seismograms.

**Another new log that may become important in exploratory work is the nuclear magnetic log developed jointly by Borg-Warner Corp. and California Research Corp. (PW—Oct.9'59,p26).**

Byron Jackson Division of Borg-Warner, which hopes to offer the tool commercially soon, says it has recently built a second tool that is the prototype of commercial equipment. BJ believes the current tool represents considerable improvement, and has performed significantly better than the first experimental model.

While considerable testing was done to perfect instrumentation with tool No. 1, field tests are still being conducted with tool No. 2. BJ says additional knowledge now being gained will bear on the tool's method of application. The company is satisfied, however, that it is operational at present.

**Yet another logging tool that may prove valuable to**

**continued ▸**

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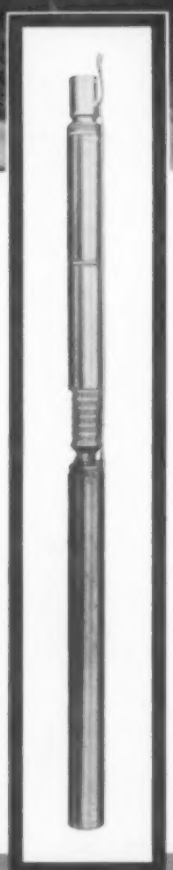
WHEN YOUR CONTRACT IS WITH GENERAL, THE PERCENTAGE FOR SUCCESSFUL EXPLORATION IS IN YOUR FAVOR !

# OVER 300 REDA PUMPS PROVIDE LOW-COST PRODUCTION FOR GREEN COUNTY, KENTUCKY

*Photo Courtesy E. D. Blanchard, Aqua Well Drillers, Chattanooga, Tenn.*



## Small REDA Units Make Profitable Producers of High Water/Oil Ratio Wells

Using Reda Submergible Pumps, Green County producers have been able to profitably pump wells, proven unprofitable when other types of pumps were used.

The wells are shalow, producing from 350 to 600-foot depths. They have an average water/oil ratio of 10 to 1, with some as high as 100 to 1.

Small size Reda units were introduced into the field, and quickly replaced many other types of pumps of excessive cost and size.

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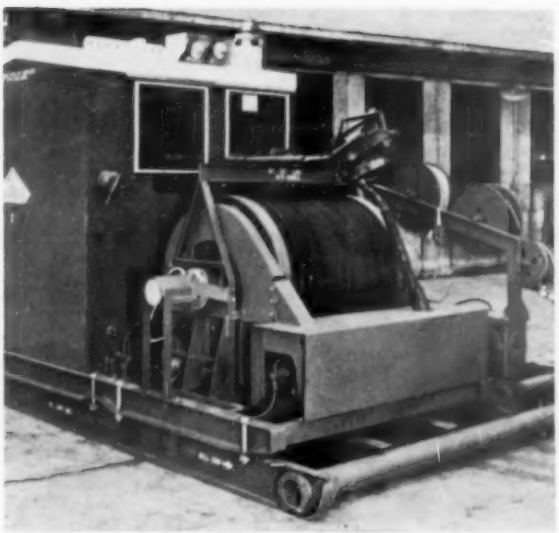

LOGGING UNIT developed by Schlumberger can be disassembled into units of 4,000 lb. or less for easy airlifting.

**the geologist—primarily as a means of determining salinity of formation water—is Lane-Wells Co.'s Chlorinilog.**

Lane-Wells, one of the Dresser Industries, reports: "It is now feasible to differentiate oil-bearing from salt-water-bearing zones behind well casing with a combination neutron curve and a chlorine curve.

"The two curves fall along the same line opposite oil-filled or fresh-water-filled zones. Opposite salt-water-filled intervals, however, the two curves depart from each other in recorded response, and thus offer a graphic means of distinguishing hydrocarbon-bearing from nonproducible horizons."

The instrument used for recording both curves is of the scintillation type.

**McCullough Tool Co., Los Angeles, has a new nuclear log for the determination of reservoir salinity.**

McCullough's salinity log was developed to satisfy needs created by limitations of the electric log, primarily the inability to record through casing. This is particularly important in the case of salinity determinations, McCullough believes, because of changes in the invaded zone adjacent to the wellbore during drilling.

After casing has been set and a few days have elapsed, the reservoir pressures and fluids tend to return to equilibrium, and more realistic readings can be obtained. This is not possible with electric logging.

McCullough's salinity log has the same principle of operation as does the Chlorinilog, being also dependent on the detection, measurement, and recording of chlorine and hydrogen curves by a scintillation device.

**Another advance in the field recording of log data, regardless of the source, is a 14-pen, dual chart recorder recently introduced by Birdwell.**

The recorder, now being installed on all Birdwell logging trucks, has two chart drives that permit simultaneous recording of well information on different scales. The pens are of special design, and use a nonclogging chemical in place of ink.

James M. Bird, SSC vice-president in charge of the Birdwell Division, says one big advantage of the recorder is its capability to produce a log visible to the operator as it is being recorded.

Unlike galvanometric recorders, the Birdwell device gives a precisely linear response to measured characteristics. This makes possible the continuous recording of any given character versus time, a function of depth.

Birdwell is using its new pen recorder in combination with existing multipurpose logging tools, making it possible to log many wells completely with but one trip into the hole.

## Gains on Other Fronts, Too

**Geochemistry, virtually written off a few years ago as an effective approach to oil finding, is coming back strongly.**

The research affiliate of one major oil company currently investigating geochemical detection of hydrocarbon deposits is using a mass spectrometer, an emission spectrometer, and a gas chromatograph to identify and correlate trace elements found in surface soils overlying and adjacent to known oil and gas pools.

Company scientists are uncertain that any trace element will be found in association with such pools with sufficient consistency to make correlation possible. They are moving rapidly ahead, however, with the building up of a backlog of data based on hundreds of soil samples from proved oil-producing areas. If spectroscopic and chromatographic analyses suggest one or more indicator elements, the research group will move into the second phase of its program—attempting to predict the occurrence of untapped oil and gas accumulations.

Notes the group leader: "This approach is in the category of another long-term bet we can't afford to overlook. It could furnish the exploration breakthrough we need—or it could take us up another blind alley."

Atlantic Refining Co.'s use of a Beckman nondispersive spectrograph to detect marine gas seeps has a somewhat similar approach (PW—Apr.24'59,p34). This method seeks the presence of methane gas in seawater samples. The company says several surveys of marine seeps have been carried out using equipment mounted on various vessels, ranging in size from a 14-ft. outboard skiff to a coastwise freighter. Under most circumstances, cost of such surveys is only a few cents per acre.

**At least one geophysical concern says it is "now in a position to offer a contract geochemistry service to its customers."**

Geophysical Service Inc., Dallas, indicated to PETROLEUM WEEK that research and field work have convinced it that geochemistry is a workable oil-finding tool, though perhaps not a precise one.

So far, about all GSI will disclose concerning its method is that it seeks a "hydrocarbon derivative" indicative of an anomaly or an "area of interest." The company says it does not look upon geochemistry as a direct oil-finding tool, but rather a "low-cost, high-speed reconnaissance tool which should be used as such."

Company scientists say their observations show that indications of a subsurface petroleum deposit usually offset the location at the surface—in other words, the deposit isn't directly under the surface evidence.

continued ▸

TELLUROMETER, radar-like surveying device first used by pipeliners, is now used in refraction seismic survey work.

**An old geophysical concept that continues to show considerable life is the surface electrical survey.**

One approach to this method of subsurface exploration is currently being investigated by Southwest Research Institute. Involved is the utilization of an "array of electrodes" in contact with the earth's surface. A return reading arrangement provides the operator with indications of subsurface electrical conditions.

Not only is such a device capable of detecting such features as faults and structures, but also the harder-to-detect porosity pinchouts and oil-water contacts, SwRI researchers believe.

The independent research facility says evaluation of the concept is in an early phase, and that no conclusion of any kind has been formed as to its feasibility in locating petroleum accumulations.

**Sinclair Research Laboratories now has an experimental truck-mounted electrical survey unit in the field.**

Sinclair describes the operation of its unit as having a transmitting source that is firmly planted on the ground surface in the test area. A recording truck carries a receiving antenna, which picks up reflections at varying distances from the transmitter.

The company reports that its equipment is capable of recording reflections with a truck speed of 12 to 15 mph. So far, a company spokesman says, depth resolution has not been good.

**The Tellurometer, a radar-like system composed of a master and remote unit which measures distances by means of microwaves, is being used for seismograph surveying.**

One geophysical contract company now using the instrument for seismic surveying is Geophysical Service Inc. GSI reports that it has found the instrument so reliable and practical that it is now included as a matter of course on all company refraction jobs.

Used originally by the oil industry for pipeline right-of-way (PW—Nov.20'59,p41), and more recently in Canada for survey work (PW—Mar.25'60,p28), the Tellurometer owes its application in seismic work to the resurgence of refraction shooting. For reflection work, where shotholes are much closer together, and precise horizontal control over large distances is not so critical, it has little appeal.

In refraction work, the vertical travel time of the shock wave between the shot point and the recording equipment is obtained by subtracting the horizontal component of travel time from total observed time. This horizontal distance is determined from the surveyor's measured shot-to-recording-point distance and the horizontal refraction velocity. Since the horizontal refraction velocity is normally quite high, it is necessary that the surveyed distance be very accurate.

GSI says that besides obtaining the high order of surveying accuracy desired through use of the Tellurometer, it has been able to cut permit costs by shooting across nonpermitted land. Effective sighting distance is on the order of 50 mi., though line-of-sight conditions are, of course, required.

For most operations, GSI carries its vertical control by independent survey with transit or barometric observations. The choice depends on the job requirements. Experience to date indicates that this arrangement cuts required surveying time by at least 20%, and at the same time gives accurate results.


## Reprints Available

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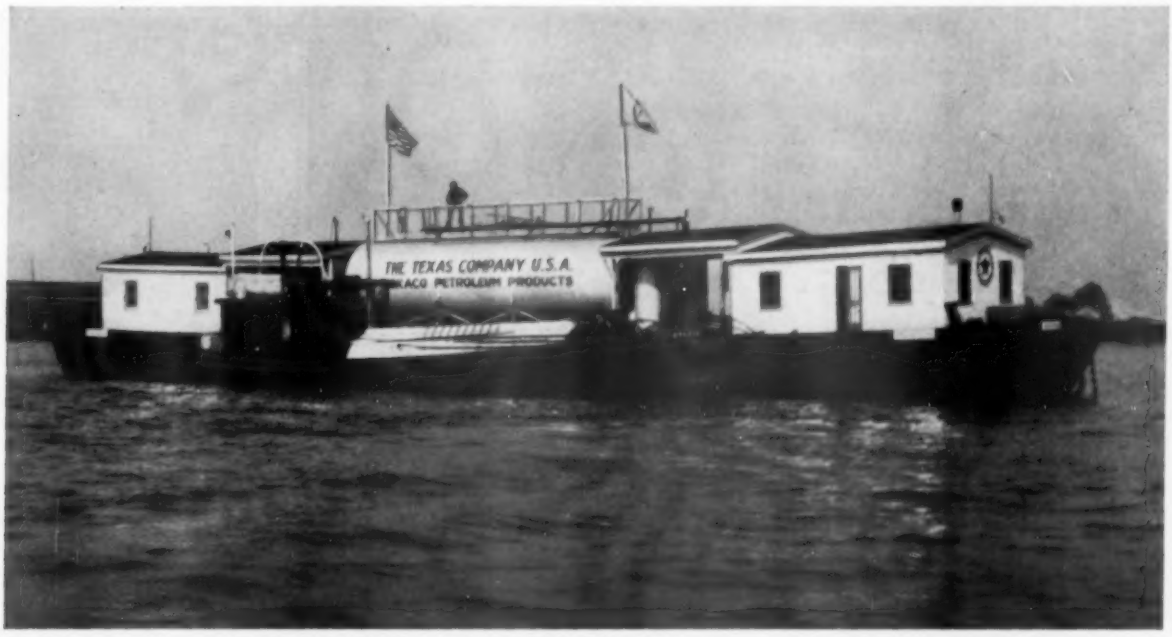
# From coastal to global operations




YESTERDAY—Shortly after its founding in 1902, Texaco had only one, small, wooden barge—transporting crude oil slowly along the Gulf Coast and up the Mississippi. Its capacity was 170,000 gallons.

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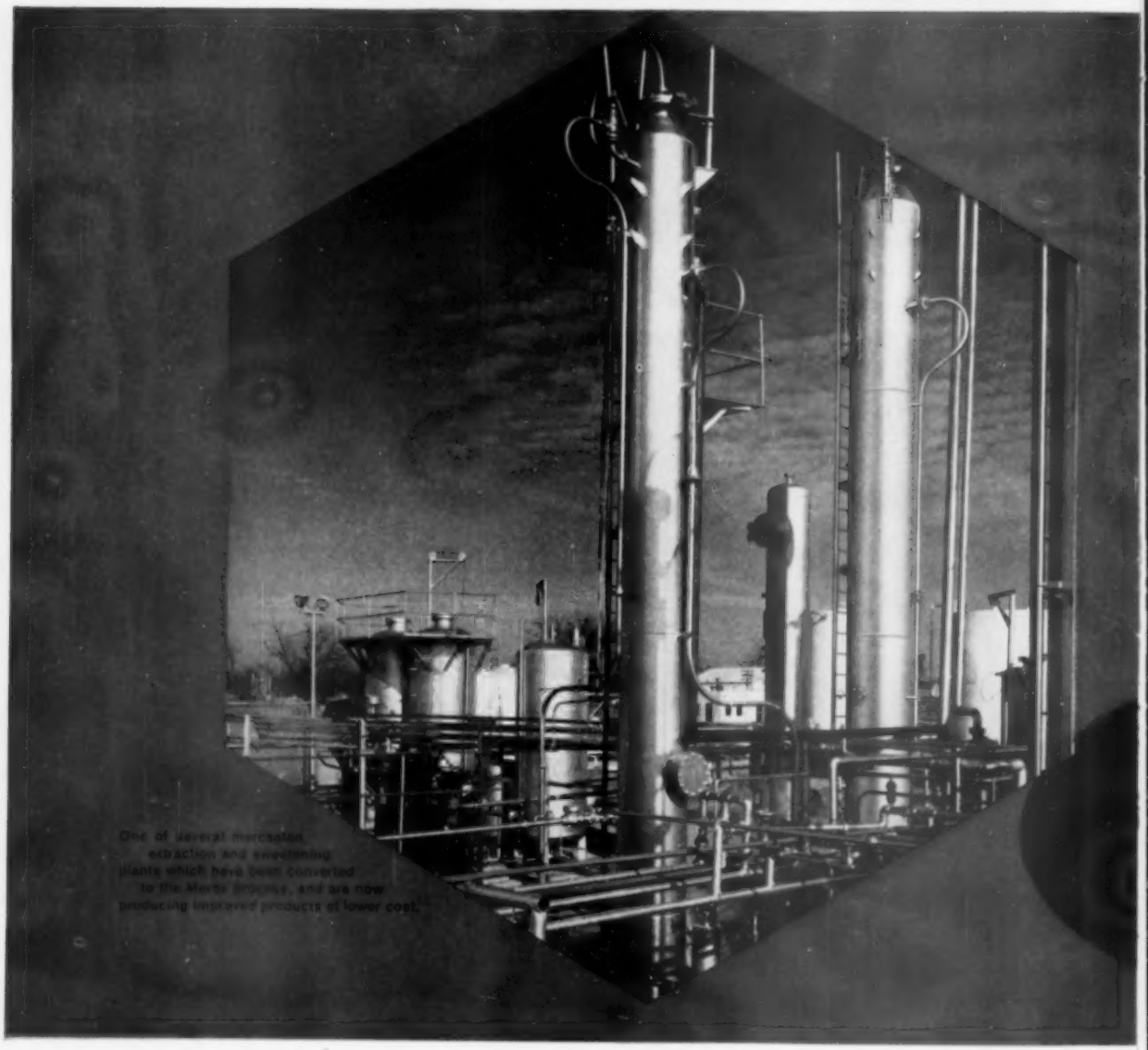

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WHERE RESEARCH TODAY MEANS PROGRESS TOMORROW

# Modern Refining Makes Better Fuel Oil

**"The heating oil customer is getting more for his money today than ever before,"** according to Russell W. Henry, applications engineer of Shell Oil Co.

"Heating oil refining has passed from an 'art' to a 'science'," Henry told the 38th annual convention of the Oil Heat Institute of America in New York this month.

As a result, the quality of heating and diesel oils available today is far better than that of the distillates that were available in the '30s, he added.

**Improvements in the quality of heating oils became a necessity when the methods of producing them changed** as a result of soaring gasoline and distillate demand.

The distillates made in the early days of skyrocketing oil-heat and dieselization popularity were straight-run products of the distillation still, with a small addition of gas oil from thermal cracking.

All these distillates needed to make them commercially acceptable was a summary acid wash and a caustic neutralization.

The advent of catalytic cracking and its generalized acceptance in most refineries changed the picture. From 1940 to 1959, cat-cracking capacity in the U.S. increased from 50,000 b/d to 1,500,000 b/d.

Today's heating oils consist of distillates from cat-cracking fractionators, blended with some straight-run gas oil, and adjusted for volatility and pour point.

**Heating oils produced by modern cat-cracking methods are substantially less stable than the straight-run products with which heating oils used to be made.**

Their instability is caused by complex reactions involving sulfur, nitrogen, and polyaromatic components. These reactions lead to the formation of long-chain heterocyclic compounds called asphaltenes, which are colloidally dispersed in the fuel.

Droplets of suspended water—coming from the unavoidable moisture in the air—promote the agglomeration of asphaltenes during storage.

This causes sedimentation and clogging of screen filters, and impairs proper operation of oil burner nozzles or diesel injection systems.

Heating oils undergo long periods of storage during the summer months, when stocks for winter consumption are being prepared in refineries. They must therefore be made storage-stable.

**When refiners found themselves faced with this problem of distillate instability, they undertook extensive laboratory tests to study its causes and devise remedies.**

Among these tests were:

- Simulation of fuel oil circulation in scaled-down models.
- Filter tests.
- Accelerated aging tests.
- Use of the electron microscope to study particle-size distribution.
- Full-scale storage tests.

**Several treating methods were adopted by refiners to bring back the old stability. As a result, heating oils and diesel fuels today are even better than those of the old straight-run days.**

Among these methods, the most popular are:

- Improved acid and caustic washing, with the help of electrostatic precipitators to remove the emulsions (PW—May29'59,p62). Shell Oil Co. estimates that electrostatic equipment capable of treating 800,000 b/d of distillate fuels has been installed in the U.S. in the past ten years.
- Hydrogenation. Refineries equipped with catalytic reforming units have a supply of hydrogen that can be put to good use in various purification processes. Hydrogenation of distillates, under pressure and high temperature in the presence of a catalyst, will remove almost all the sulfur and nitrogen compounds, and at the same time improve diesel index and cetane number of distillates. Shell estimates that 377,000 b/d, or 40% of the distillates produced in the Gulf-Atlantic Coast area, are hydrogen-treated. The capital invested in that area for hydrogenation is about $75-million.
- Fuel oil additives are also being used in distillates at an increasing rate. They are generally surface-tension modifiers. It is estimated that 16-million lb. of additives, costing close to $10-million, will be used in 1961 in military and commercial jet fuels, heating oils, and diesel fuels.

These additives will, in varying degrees, perform all or some of the following functions:

- Prevent screen clogging in the presence of moisture.
- Disperse finely divided sludge particles and prevent their agglomeration.
- Reduce foaming tendency.
- Inhibit color deterioration.
- Aid the settling of moisture haze.
- Prevent rusting of ferrous surfaces.
- Reduce the catalytic effect of metals, particularly of copper.

## Amoco to Build Largest Crude Unit

**American Oil Co. is scoring double on largest-in-the-world units: Construction will soon start at its Texas City (Tex.) refinery on the largest crude still and the largest alkylation unit.**

The crude unit will be a two-stage pipe-still with fractionation system, handling 150,000 b/d. This is 10,000 b/d more than the huge crude still at the Whiting refinery of Standard Oil Co. (Ind.), Amoco's parent (PW—May1'59,p40). It will do all processing of non-asphaltic crude at the refinery.

The alkylation unit, handling 14,600 b/d, will include butane-splitting and isomerization facilities.

In addition, a catalytic cracking unit of 47,600 b/d will be installed.

**The new installation will increase only slightly the present crude-running capacity of the refinery. Its main purpose is to increase product quality and operating efficiency,** according to L. W. Moore, Amoco's president.

Actually the three units will replace several outmoded units—some of them 26 years old.

"The modernization program," Moore says, "will allow us to obtain increased yields of higher-octane gasoline from crude, and we expect at the same time to be able to reduce our costs appreciably."

The modernization program at Texas City is part of a company-wide capital improvement program, including distribution, marketing, and manufacturing facilities.

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# RESEARCH

## from an engineering point of view

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# Space-Flight Lubes Puzzle Scientists

**Although bearing materials that give satisfactory service over the wide range of temperatures at which military flight vehicles will soon have to operate are available, lubricants to match these bearings are still lacking.**

This condition prevails today despite an enormous amount of research work done by the U.S. Air Force in cooperation with private industry, according to P. C. Hanlon, chief of the bearings section of the Aircraft Laboratory of Wright Air Development Division. He reported the latest developments of this work at the recent aeronautics meeting of the Society of Automotive Engineers in New York.

**In an effort to develop the proper combinations of bearings and lubricants, a program of tests was recently undertaken with grease-lubricated airframe bearings in the temperature range from 300F to 600F.**

This type of bearings is not subjected to high speeds. It is subjected instead to relatively slow cycles of oscillations—approximately 250 per minute. For the tests, the load ranged from 1,000 to 10,000 lb. and the life expectancy of the bearings was set at a minimum of ½-million cycles. Grease lubrication was applied every 18 hours.

Three bearing materials, two bearing designs, and several high-temperature greases were evaluated.

A plain silicone-base grease, and one silicone-base grease modified by milling in 50% of metal-free phthalocyanine have shown promise of satisfactory operation at 600F. Phthalocyanine is an organic solid material derived from toluene, which possesses thermal stability in an oxidizing environment up to temperatures in excess of 1,000F.

**A second and more drastic program of tests with airframe roller- and ball-bearings is now being conducted in a temperature range from —65F up to 1,200F.**

For these tests, the motion that the bearings must withstand consists of 100 oscillation cycles per minute, and life expectancy is arbitrarily set at 40,000 cycles.

"A design development is currently in progress at WADD to produce an airframe roller bearing capable of operating at an altitude of 250,000 ft.," Hanlon said. "It will withstand temperatures up to 1,200F and be resistant to the effects of nuclear radiation."

**The first phase of this program consisted of dry runs—without any lubricating aid.**

Out of 76 bearing materials, six were selected for further evaluation. These are specific types of tool steel (M-2), stainless steel (440-CM), titanium carbide (K-161B), chromium carbide (CR-2), and Stellite (Star J).

**The next phase consisted of the evaluation of lubricating aids as a means of extending the useful operating time of the bearings.**

The 25 lubricants tested included such materials as:

- Eight liquids, of both petroleum and nonpetroleum origin.
- Two phthalocyanine thickeners.
- Five powders, such as molybdenum and tungsten disulphides, boron nitride, cupric and lead oxides.
- Ten coatings and films.

"Although none of the lubricating aids provided any significant improvement in performance," Hanlon said, "it must be recognized that some may have considerable potential at less severely loaded conditions."

**For bearings of electrical accessories operating at high speeds as well as at high temperatures, the problem is more complicated,** WADD has found.

The speeds considered are around 24,000 rpm. Starting from scratch, it was necessary to determine proper bearing materials, designs of bearings, satisfactory lubricants, and lubricant application techniques.

Two systems of lubrication showed promise, the grease-packed bearing, and the "once-through" system.

Bearing life increased when the bearing was fully packed with grease —as much as 90% fill, Hanlon pointed out. This is contrary to good practice at moderate temperatures, where such packing would be considered much too high. But there was no churning or whipping. Grease life decreased as temperatures increased, along a logarithmic function. It could be extended by adding periodically some of the fluid component of the grease.

The "once-through" system uses a mineral oil with an extreme-pressure additive, in a solid jet. It has the disadvantage of requiring a large oil capacity. This can be overcome by a "once-through oil mist technique," which requires extremely small oil flows.

Four classes of compounds are likely to provide a suitable fluid lubricant. They are phenoxyphenyl ethers, chain-type polyphenyls, silphenylenes, and ferrocenes.

Nonsoap thickeners such as high-melting polymers, ureas, complex aromatic amides, and sulfonamides are also being investigated.

The program is scheduled for completion this summer.

Tests are being carried out at present with bearings made out of various ceramics of great toughness and high surface finish.

**Still another program of tests is aimed at determining the most satisfactory combinations of bearings and lubricants for auxiliary propulsion engines in missiles and space vehicles.**

These are also high-speed tests.

Ball bearings with 20-mm. and 85-mm. bores are being tested in this program. The speed considered is 50,000 rpm. and the temperature is 1,200F.

"As bearing temperatures exceed 1,000F it becomes apparent that organic fluids are practically useless," Hanlon said.

Several other lubrication approaches must be considered. Among them are solid lubricants, use of reactive gases, chemical treatment of the bearing surfaces, and combinations of these techniques.

Ball bearings of Haynes alloy, with molybdenum sulfide as lubricant, have operated satisfactorily for 11½ hours at speeds of 30,000 rpm. and ambient temperature of 1,200F.

Ceramic bearings have given promise of good results with phthalocyanine as lubricant.

Dry powdered lubricants can be supplied to the bearings in suspension in nitrogen, and the lubricant can be recirculated, Hanlon reported.

At the same meeting, W. J. Anderson and Ed. E. Bisson of the Lewis Research Center of the National Aeronautics and Space Administration, arrived at similar conclusions.

"Conventional lubricants are deficient at high temperatures," they said, "because of lack of oxidative and thermal stability."

**Several lubrication techniques offer possibilities of at least limited success at high temperatures,** according to the NASA engineers. And some of these techniques coincide with those tried by WADD.

They include:

- "Closed" lubrication systems, blanketed in an inert gas (PW—Nov. 6'59,p96). This allows mineral oils to remain stable at temperatures at least

150F higher than they would in an oxidizing atmosphere.

• New classes of lubricants, such as polyphenyl ethers, hydrogenated petroleum fractions, and liquid metals.

• Vapor-phase lubrication, such as can be accomplished by producing a reducing atmosphere with rich mixtures of JP-4 fuel and air, with an extreme-pressure additive for boundary lubrication.

• Gas lubrication, which seems to have possibilities at high temperatures.

• Lubrication by means of gases containing reactive halogen atoms. These are primarily chlorine-, bromine-, and fluorine-substituted methane or ethane gases.

Effective lubrication up to 1,200F can be obtained, but care should be taken to avoid any corrosion that might occur because of the presence of the halogens.

• Use of solid lubricants, especially molybdenum disulfide.

• Dry operation, with some components of the bearings made of a graphitized carbon impregnated with an organometallic product. Special alloys, with extremely low coefficients of friction at 1,000F, have also given promising results.

# What's New / IN PROCESSING AND PETROCHEMICALS

**The first commercial Hydrar unit for production of high-purity cyclohexane from benzene has gone on stream at Gulf Oil Corp.'s Port Arthur (Tex.) refinery.**

The new installation, designed by Universal Oil Products Co. and built by Procon, Inc., will produce cyclohexane especially adapted to the manufacture of nylon. It is also used as a solvent in the manufacture of plasticizers and synthetic lubricants.

Feed stock for the Hydrar unit is supplied by an adjacent benzene plant. By adding the new unit, Gulf will be able to coordinate production of benzene and cyclohexane with demand for the two petrochemicals.

•

**Delhi-Taylor Oil Co. continues its petrochemicals expansion program with the construction of an orthoxylene plant at its Corpus Christi (Tex.) facilities.**

Total capacity of the new plant will be about 70-million lb. per year of high-purity orthoxylene, used in the production of phthalic anhydride for polyester plastics and plasticizers, and alkyd resins. The orthoxylene will be separated from a high-purity mixed xylene stream currently extracted in the company's Platformer-Udex unit. The new plant is slated for completion in June.

•

**A program for the manufacture of several grades of aviation gasoline and jet fuels is getting under way at Cities Service Oil Co.'s new refinery at Trafalgar, Ont.**

The company plans to broaden its line of petroleum products through a $500,000 expenditure on the Trafalgar facilities.

•

**Ashland Oil & Refining Co. has altered plans for its first commercial hydrodealkylation (Hydeal) plant; the unit will have 25% greater capacity than originally proposed.**

Anticipated capacity is now 75-million lb. per year of napthalene and 15-million gal. per year of benzene.

The unit, scheduled to go on stream by Mar 1, 1961, will be located at Ashland's refinery at Catlettsburg, Ky.

The Hydeal process, developed by research groups of Ashland and Universal Oil Products Co., is currently being licensed by UOP to the petroleum and chemical industries.

•

**Ice cubes were used recently by Union Oil Co. of California to remove scale and rust from large freshwater lines at its Los Angeles refinery.**

Union put 4-in. cubes in a 10-in. water line and pumped them through at high velocity. The company says the cubes did a satisfactory cleaning job—at a substantial saving over the usual chemical method. Some 400 lb. of ice cubes were used to clean 3,000 ft. of line.

•

**Tennessee Oil Refining Co. will build a natural gas processing plant near Palacios, Matagorda County, Tex., designed to process 55-million cu. ft. per day.**

A 6-mi. pipeline will be laid from the new plant to connect with the products pipeline operated by the Tennessee Gas Transmission Co. subsidiary (formerly Bay Petroleum Co.). The company also plans to construct a 16-mi. gas gathering system in the Palacios area.


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# Here's a Unique Unit Operating Plan

**CARACAS—The world's biggest unit operating agreement, just signed in Venezuela, is undoubtedly also the oil industry's most unusual unit arrangement** (PW—Apr.15'60,p62).

The pact by four U.S. operators in Lake Maracaibo provides for initial crude production of over 200,000 b/d. It covers a Lower Lagunillas sand reservoir with primary reserves believed to total 600-million bbl., in the lake's Southwest Bachaquero area.

Parties to the agreement are Shell of Venezuela, Creole Petroleum Corp., Mene Grande Oil Co., and San Jacinto Venezolana, which also represents seven partners in its acreage.

**Flexibility of offtake rates is the most unusual aspect of the new pact,** as compared with other unit operations either in Venezuela or elsewhere.

In most units, the participants divide all production on an equity percentage basis, and must agree on production rates.

**Also, unlike practice in the U.S., there is no unit operator.** This is not uncommon for Venezuela, however, where each party usually operates the acreage it contributes to the unit.

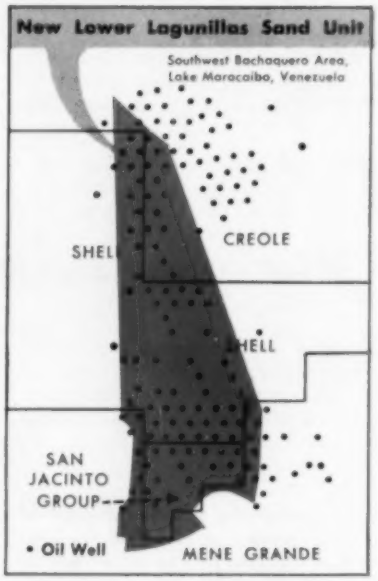
The reason for this is that operating companies generally have large tracts of more or less contiguous concessions in many areas, which they must continue to operate regardless of the unitization of some reservoirs. In Venezuela, therefore, the economy of having just one unit operator is much less than in countries where leases are small and ownership is widely divided.

**Each party to the new unit agreement may produce at the rate it wishes,** up to a maximum determined by its equity percentage of the producing rate established for the whole reservoir.

**Of the over-all reservoir producing rate, 10% is reserved** for participants that fall behind the others and wish to make up deferred production.

**Another feature, unusual for Venezuela, is that the new agreement was signed before any decision on supplemental recovery.**

Participants consider that even without fluid injection, unit operation can increase ultimate recovery through more efficient use of gravity drainage. The participating companies will look at possible supplemental recovery programs as soon as sufficient data are available to assess the probable results.




**San Jacinto and its seven partners —'newcomers' to Venezuela—will have a 16.19% interest in the unitized production,** subject to minor revision when full development of the reservoir is completed.

The seven partners all signed the agreement, though San Jacinto will be their sole spokesman in the unit operations. They are: Tennessee-Venezuela, Union Petrolera Venezolana (Union Oil & Gas of Louisiana), Murphy-Venezuela, Monsanto Venezuela, Sharples Oil Corp., Petrobelge of Venezuela, and American Petrofina of Venezuela.

**Exact equity shares of Shell, Creole, and Mene Grande have not been publicly disclosed.**

They are, however, roughly indicated by figures of the Ministry of Mines & Hydrocarbons on cumulative withdrawals from the reservoir by all four operators. Through December, 1959, these were: Shell 50-million bbl.; San Jacinto 14.8-million bbl.; Creole 13-million bbl.; and Mene Grande 7.9-million bbl.

**Production is from 85 wells,** completed at depths ranging from 8,500 ft. to 11,500 ft.

The reservoir has an average net sand thickness of 150 ft. The crude is around 27-gravity.

**Surface area of the new unit is 13,239 acres,** roughly 10 mi. long and 3 mi. wide. Of this, 1,969 acres is San Jacinto group's tract.

# Iran Cool to French Oil Policy?

**TEHERAN—In apparent reference to France's moves to gain priorities for its Sahara crude in Europe's markets, Iran is letting it be known that it is closely watching any "discriminatory policy" on the free movement of oil** in international trade, a subject with which it is "most concerned."

This statement of Iran's attitude was made by B. Mostofi, a director of National Iranian Oil Co., in a talk at the recent Bangkok meetings of the Economic Commission for Asia and the Far East.

Iran's oil income, Mostofi explained, is its greatest source of foreign exchange earnings, and serves as the backbone of its development plans.

Last year, for example, he said, Iran earned a total of $330-million in foreign exchange from the oil industry, the major part of which was allocated to development projects.

**In fact, Iran wants to increase its rate of crude production, and hopes that export volume eventually will match the country's "tremendous" oil reserves,** Mostofi added. He said Iran's reserves at present are estimated to be about 15% of the world's total.

Last year, he noted, Iran's crude production was increased 13% to 343-million bbl. (And total output, he remarked, was obtained from only about 100 wells producing an average of 10,000 b/d.)

Further, he said, an additional export capacity of 120-million bbl. of oil a year is now available for immediate use, following completion of new pipeline and loading facilities on Kharg Island in the Persian Gulf.

**Discovery of reserves of "significant importance" in North Africa has already had its effect on Middle East oil exploration and development programs—Iran excepted**—Mostofi said.

In Iran, he added, the pace of exploration for discovery of new oil resources was not only maintained in 1959, but actually increased slightly.

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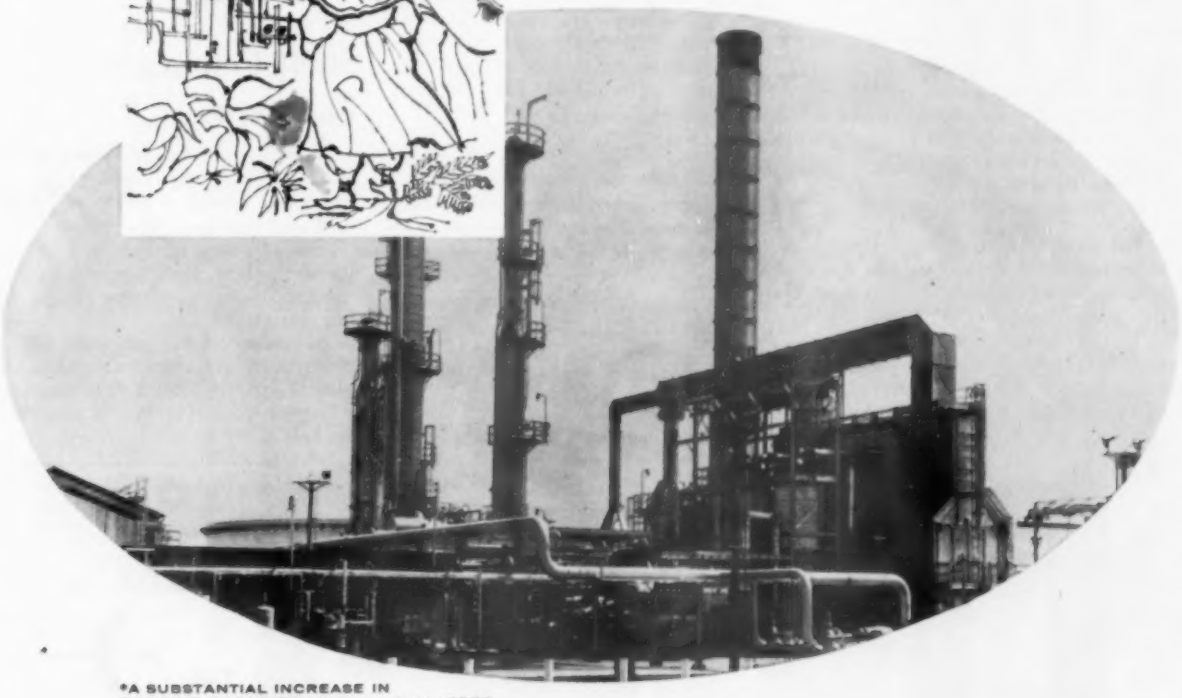

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# Venezuela Shifts to Middle Course

*(From* PETROLEUM WEEK'S *Caracas Bureau)*

**CARACAS—A middle course between state and private development of petrochemicals was marked out by the Venezuelan government last week in a long-awaited policy declaration.**

The statement is intended to mark off general areas of government activity as a guide to potential private investors in steel and iron ore, as well as chemicals and petrochemicals.

(It states that no more iron ore concessions will be granted—a policy already instituted on oil concessions—but invites offers for joint government-private development in that field, similar to arrangements expected of the new national oil company that is being set up this week.)

**The government will expand petrochemical facilities and at the same time encourage private development,** the policy statement reveals.

The declaration is a draft still subject to approval of the Venezuelan cabinet. But its publication by the president's office indicates little change is expected in the final version.

**The statement says it is necessary to expand the plant complex of the government's Petrochemical Institute** to include transformation of hydrocarbon products such as acetylene, ethylene, propylene, and butylene. Manufacture of synthetic rubber is also specifically mentioned.

**The plants now under construction by the institute, it adds, are actually basic chemical—rather than petrochemical—plants** for manufacture of sulphuric, phosphoric, and nitrogenous chemicals. The institute is also studying plants to make chlorine-based insecticides, polyvinyl chloride plastics, and civil explosives.

**The government alone, it says, cannot make the investments necessary for full development of Venezuela's petrochemical potential—nor for marketing of the products abroad.**

"Therefore," it states, "the government considers that the development of the Venezuelan petrochemical industry should not be confined to the scope of the Venezuelan Petrochemical Institute.

**"It is convenient that new plants be established by private enterprise—either with or without government participation"**—the statement continues, "whenever there is no real advantage in preferring the expansion of the Petrochemical Institute's installations."

The Petrochemical Institute, the declaration adds, "will stimulate private investment by providing information and technical assistance to interested parties."

## Shell Celebrates In Egypt

**CAIRO—For the first time since the Suez crisis, the Shell group in Egypt has broken a policy of "work hard and sing low."** It celebrated the 49th anniversary of the start of its operations here with a splash of advertisements and parties for employees and marketers.

"We supplied the oil for the lamps of Egypt 49 years ago," the ads said. "Today, we provide power for the industrial revolution that is sweeping the land."


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# Creole's Net Slumps to 49c a Barrel

**Net profits of Creole Petroleum Corp., Venezuela's biggest and most profitable producer, tumbled further last year—down to a rate equal to only 49¢ per bbl. of production** (PW—Oct.16'59,p24).

This compares with a rate equal to 60¢ in 1958 and 94½¢ in 1957. It is also far below the per-barrel rate of profits for leading crude producers in the U.S., and compares with a profit range on the order of 70¢ to 80¢ in the Middle East.

In its annual report, Creole last week reported a drop to $200,332,845 in its 1959 net income, from $235,656,375 the year before.

The 15% drop was due "principally" to lower prices for crude and products, said A. T. Proudfit, president of the Jersey Standard Venezuela affiliate.

Creole's tax payments to the Venezuelan government will total $389-million for 1959, down from $419-million for 1958, Proudfit reported.

**The company's sales were up a scant 1%,** to 1,145,715 b/d of crude and products, from 1,134,533 b/d in 1958.

Crude output was up 4% from 1958 at 1,145,715 b/d, but did not reach Creole's previous record, set in 1957.

Refinery runs, however, were at a new high of 364,477 b/d, up 18% from 1958.

**Creole sees no signs of an improvement this year. In fact, it faces a "struggle to retain existing markets"** as well as to obtain new customers, Proudfit said.

"Some of our traditional markets are becoming increasingly vulnerable to the competitive pressure of oil from other sources," he said.

Notwithstanding a 6% growth in world oil consumption in 1959, the entry of new producing areas in the world oil picture, plus high levels of output in established areas, aggravated world oversupply conditions and contributed to further weakening of prices, the Creole official said.

**Also, Creole expects further pressures on profit margins in 1960 because of "higher operating costs** in Venezuela and continued price weakness."

The added labor costs in the new three-year labor contract signed in February, plus the increased income tax rates imposed in 1958, constitute a "heavy burden" on Creole, he said.

**The company's capital expenditures last year were cut to the lowest level since 1951.** They were down to $61-million in 1959, from $140.5-million the year before and $260.8-million in 1957.

**Creole also reports it had 262,000 b/d of excess producing capacity in 1959,** when it says its efficient capacity was 1,386,000 b/d compared with actual production of 1,124,488 b/d.

**Development drilling was sliced in half, and exploration expenditures were also slashed** (to $16.4-million, from $29.4-million in 1958).

Active exploration was continued, however, in the new concessions that Creole had acquired during 1956 and 1957.

**Creole also reported minimum operations in 1959 at its year-old LPG plant—due to U.S. import restrictions,** which curtailed "what was expected to be a promising market" for LPG products.

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# What's New / AROUND THE WORLD

## Second Libyan Find Chalked Up by Mobil

**LIBYA—Mobil Oil has brought in No. 2 Hofra (A-2-11) as its second Libyan discovery for 1,500 b/d** of 43-gravity, water-free oil from about 3,030 ft.—the shallowest discovery in Libya to date.

The well, in the Sirte basin of central Libya, is 1 mi. northeast of No. 1 Hofra (A-1-11) and about 15 mi. southeast of the Conorada group's B-1-32 discovery in an adjoining concession.

The first Mobil discovery was El Amal (B-1-12), 190 mi. east of the new discovery.

•

**EL SALVADOR—Esso's proposed refinery at Acajutla is now one step closer to realization.** A presidential decree has been signed under which it would get benefits of a 1952 law granting customs exemptions for imported crude, as well as equipment. Shell also has applied for these benefits for its own proposed plant (PW—Mar.11'60,p36).

•

**INDIA—The government now has plans for a third state-owned refinery—this one a 10,000 b/d to 20,000 b/d plant in the Cambay region** of Bombay state, where India's Oil & Natural Gas Commission has found oil in all five tests it has drilled. This was announced by India's Oil Minister, who said it is now proposed to drill 150 to 200 wells in the area.

•

**Kuwait and Iran both set new oil output records in March.** Kuwait's was 1,600,152 b/d, topping the previous peak set in April, 1959. Iran's climbed to 1,065,000 b/d, past the high of last September.

•

**IRAQ—The Russians are to carry out exploratory drilling for Iraq in the Jarabika and Naft Khaneh-Khanaqin areas** under their new contract for exploration work on a 154-sq. mi. portion of the 753-sq. mi. Khanaqin concession on the Iranian border (PW—Apr.8'60,p34). One small field was established years ago on the tract, which British Petroleum relinquished in late 1958.

•

**GUATEMALA—Plymouth Oil Co., a new entrant into Guatemala, has started aerial and surface surveys** on its first concession there, a 204,152-acre tract in the Rio Matagua Valley in the east. It has further applications pending.

•

**WEST GERMANY—The Soviet Union has again turned to Germany for pipe.** This time a $4-million order for about 20,000 tons of natural gas pipe—for delivery this year—went to Phoenix-Rheinrohr AG, of Dusseldorf.

•

**CUBA—An island-wide oil exploration drive is to be undertaken by the Cuban government's Petroleum Institute,** now that almost all private companies have been frozen out of their exploration interests.

Alfonso Gutierrez, Mexican engineer who heads the institute, concedes that the oil hunt will require heavy investment. Exploratory drilling will be started, he said, as soon as the necessary studies are completed.

•

**VENEZUELA—Creole has given up new concessions in northern Monagas** after drilling 11 dry holes. It acquired the Mosu acreage in 1956-57.

•

**VENEZUELA — Phillips Petroleum plans to drill 30 more development wells on South Monagas Block 9** in eastern Venezuela. It also now proposes to build an 80,000 b/d storage tank for crude produced from the tract, which was acquired in 1957 by Phillips and seven U.S. and Canadian partners.

•

**ARGENTINA—The Loeb, Rhoades group is now drilling its third wildcat on its 1.2-million-acre contract area** in the Comodoro Rivadavia basin. The first was completed as a small oil producer at 2,700 ft., and the second discovered gas in a shallow sand.

In addition, the three-company group is continuing development drilling on its 118,608-acre Mendoza contract area, where it has completed 59 oil wells and 10 dry holes. Union Oil & Gas Co. of Louisiana has a one-sixth interest in the venture, and Signal Oil & Gas Co. one-fifth.

•

**VENEZUELA—The loss in Venezuela's crude output compared with last year has now widened to 5.1% for the first quarter,** following a 180,300 b/d cut in March.

The month's average was down to 2,765,700 b/d. Creole's output was slashed 137,300 b/d, with Shell and Mene Grande also showing substantial cuts. Gains were registered by only four producers—Mobil, Richmond, Superior, and Caracas. Here are the government's official statistics (in 000 b/d):

| Company* | Mar. '60 | 3-Mos. Avg. '60 | 3-Mos. Avg. '59 |
|---|---|---|---|
| Creole | 1,038.0 | 1,098.3 | 1,206.2 |
| Shell | 715.3 | 762.8 | 926.1 |
| Mene Grande | 411.2 | 435.5 | 403.2 |
| Mobil | 129.0 | 118.8 | 127.5 |
| Sun | 84.1 | 68.7 | 30.4 |
| Richmond | 62.8 | 53.4 | 58.9 |
| Texaco | 56.9 | 57.4 | 56.4 |
| Phillips | 55.8 | 57.7 | 9.9 |
| Sinclair | 50.3 | 47.8 | 59.9 |
| San Jacinto | 43.6 | 44.0 | 28.0 |
| Superior | 30.1 | 28.2 | 29.5 |
| Signal | 28.6 | 29.8 | 18.4 |
| Atlantic | 24.8 | 25.1 | 25.4 |
| Mercedes | 17.1 | 17.4 | 32.7 |
| Caracas | 8.7 | 7.6 | 0.1 |
| Coro | 8.3 | 8.1 | 0.1 |
| Talon | 1.1 | 1.1 | 1.4 |
| **Totals** | **2,765.7** | **2,861.7** | **3,014.1** |

**For joint ventures, total group production is listed under operator's name.*

•

## Wildcats in the News

**ABU DHABI**—"Several interesting shows of oil" below 8,400 ft. are now being tested in the No. 3 Murban by Iraq Petroleum Co.'s Trucial Coast associate. The wildcat is 7 mi. west of No. 2 Murban, which was abandoned at 10,585 ft. after initially promising tests—like the No. 1, drilled several years ago. No commercial oil has yet been found onshore in the Trucial Coast, though an offshore field has been established off Abu Dhabi.

**LIBYA**—Oasis Oil (operator for the Conorada group) is rigging up for the second stepout from its 1,500 b/d B-1-59 discovery. The new test B-3-59, is 4¾ mi. northwest of the discovery. Oasis is drilling below 1,000 ft. in the B-2-59.

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Here's a real time saver. Not only do you get a complete workbench that's truly portable, but now you get a chain vise that's extra easy and fast to operate. Handle is right up on top where it's always handy. Handle and tightening nut are anchored to vise base . . . can't pull out.

Vise base, that overhangs front legs for clear tool swing, has hanger slots for tools, 3-size pipe bender, rear pipe rest and adjustable ceiling brace screw. Folding legs and integral tray set up easily and lock in position for rigid work base. Snap chain holds folded legs closed for easy carrying . . . no loose parts. Rubber grommets in tristand feet prevent creeping. See and try this more-for-your-money RIDGID Top Screw Chain Vise at your Supply House!

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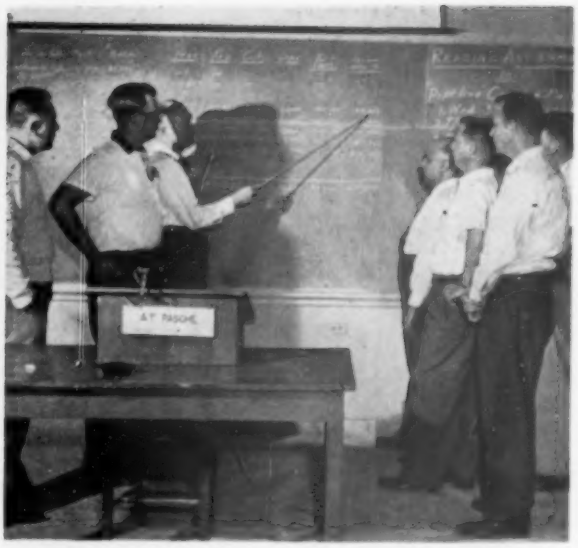
FIELD TRIPS, this one to F. H. Maloney Co.'s plant, plus . . .



LECTURES, like this one on line design economics, provide . . .

# Broad Course at API Pipeline School

**The School of Pipe Line Technology, now in its 8th session in Baytown, Tex., is winning a solid reputation as a training center for supervisory personnel.**

In the 3½ years of its existence, the school has graduated 214 men. Many of its students have been men of long service in the field. Others have been college graduates who were short on practical experience. With its emphasis on a practical—though rigorously technical—course in all phases of pipelining, the school has proved valuable to both groups.

**The school sums up its objective: "To offer a tightly organized curriculum of six weeks of practical education on pipeline transportation, and to bring to the enrollees as instructors outstanding specialists from the industry and universities."**

"There is reason to believe that the next decade will witness far-reaching extension of pipelines in the transportation of essential commodities," says the school's bulletin. "The School of Pipe Line Technology has been continued as one phase of a movement to insure the availability of qualified manpower to staff the expanding industry."

Sponsors of the school are: API's Division of Transportation, the Petroleum Extension Service of the University of Texas, the Industrial Vocational division of the Texas Education Agency, and Robert E. Lee College, in Baytown.

**Courses cover the gamut of the pipeline industry.**

Some samples from this year's curriculum. "Main Line Construction, Inspection, and Testing," "Welding," "Pipe Coating," "Design of Gathering Systems," "Main Line Tank Farms," "Selection of Prime Movers," and "Public Relations."

A total of 38 different subjects are being taught this semester, which began on Mar. 28 and will end on May 6.

A new subject this year will be "Automated Pipe Line Systems," which will receive a full days' treatment.

In addition to classroom instruction, the group will make five field trips. Among the places visited will be F. H. Maloney Co., Houston (photo-left); the pipe mill of A. O. Smith Corp., in Houston, and a tank farm of Texas Pipe Line Co.

There will also be two panel discussions in which the entire class will participate.

**Enrollment at the current session is 23 students.**

At the outset, attendance averaged 35 students a semester. It was later decided that smaller classes would provide better results, and enrollment probably will be kept below 30 in the future.

Among this spring's enrollees are men from Colombia, England, India, Iran, Israel, and Venezuela, as well as from the U.S.

Teachers are drawn from the industry and universities. They are selected initially by the school itself, but a teacher must receive a favorable rating from his students before he will be asked to return to his post at the next session. The professors are rated numerically, and, according to a spokesman, all those now teaching have gotten marks of 90% or above.

**A total of 71 companies from throughout the world, including most of the U.S. majors, have participated in the school since its opening.**

Testimonials to the school's value by firms who have sent employees are enthusiastic and eagerly given.

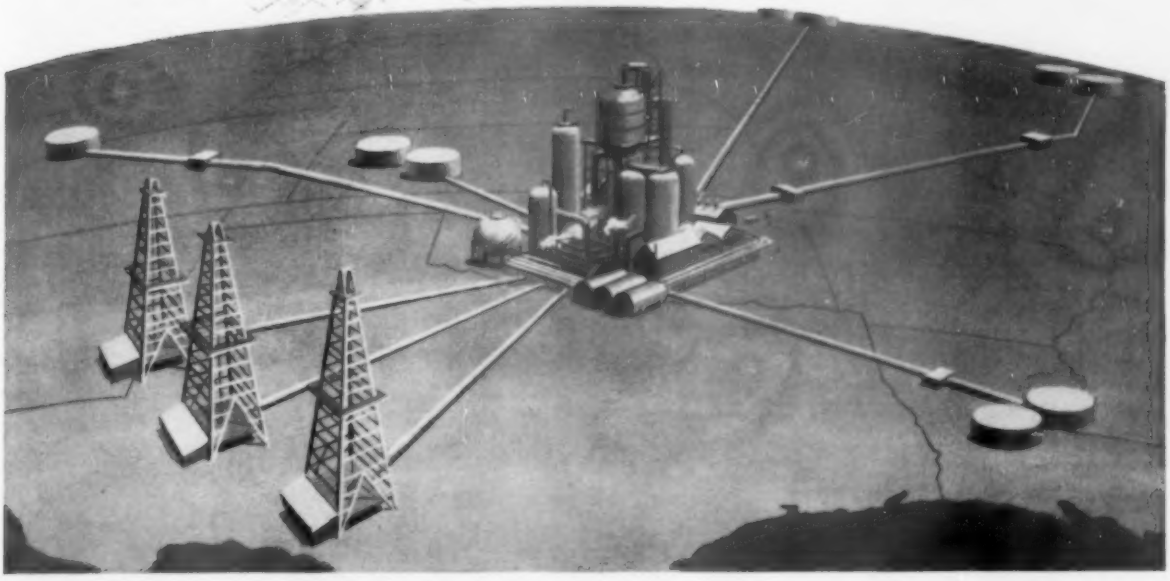
Says one company: "The school has been a great success. People who have attended have been well pleased. At the same time, we are also pleased with the results. We have found that when our people return from this school they have a much better view of the pipeline industry."

Another company comments: "Our firm thinks highly of the school. Ever since the school began, we've made it a point to send two men to the spring session and one to the fall session each year. We send second and third line supervisory personnel and our technical people."

And a third company says: "We feel this school is excellent for administrative people. That is, people with no field experience. It's suited for those individuals within the company that hold desk jobs."

*Link Industrial Control Systems Engineering...*

# SIMULATING PRODUCTS PIPELINES WITH LINK Dialog*



Optimum pipe line operation requires fast and accurate analyses of the many variables involved to assure economic delivery of pipe line products.

A Link Pipe Line Simulator is an indispensable tool for **profit-minded** pipe line management. It incorporates high-speed digital/analog computing techniques to–

- analyze economic capability of pipe line
- predict and program varying product demands
- compare operating alternatives
- study operational techniques

With the Pipe Line Simulator, you can be assured of reducing operating costs because it provides–

- precise scheduling of multiple product requirements
- reliable and dependable dispatching
- rapid re-scheduling to meet 'up-sets' or emergencies
- engineering data for design and systems study

The Dialog* Pipe Line Simulator is just one of the many Link engineered systems for serving the control, scheduling and analysis demands of the petroleum, gas, and petro-chemical industries.

*For specific details on Link Dialog Pipe Line Simulators, write to J. C. Croft, Jr., Manager, Industrial Control Products, Link Division, General Precision Inc., Binghamton, N. Y.*

**DIALOG*** (Link Digital-Analog System Components and Building Blocks)

*another example of Link/ability*

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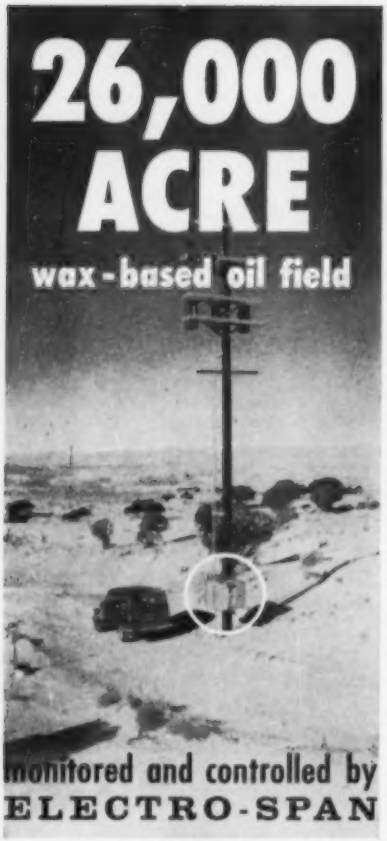



Moving crude from 88 wells to collection stations, in a remote 26,000 acre section of the Utah desert, is being successfully monitored and controlled by a Bendix-Pacific Electro-Span digital system.

This Standard Oil of California property produces a wax-based crude which must be pumped under conditions of freezing temperatures, heater, power and gathering line failures. The danger of wax-up is always imminent.

Electro-Span monitors the entire system, gives instant warning of malfunction and remotely controls gathering line heaters. The entire operation is remotely controlled from a console at the central tank battery.

For information on how Electro-Span can monitor, transmit data and control any remote function with extreme accuracy please write Department 432.

Bendix-Pacific

Division of Bendix Aviation Corporation
North Hollywood, California
(Attn: Electro-Span Sales)
Please send information on your data transmission systems

Name _____

Company _____

Address _____

City and State _____


# More Gas Expansion for Northeast

**Texas Eastern Transmission Co. plans to spend $46.6-million to expand its natural gas transmission and storage system in the Northeast to keep pace with climbing gas demand.**

TET reports that, in the 1958-59 heating season, maximum daily deliveries of "winter service gas" to customers reached 149-million cu. ft.

By the 1961-62 season, the company predicts, maximum deliveries will be up to 333-million cf/d.

TET's project, together with three joint proposals, will go before the Federal Power Commission on May 2.

**TET's program would include 212 mi. of new line, plus expansion of storage facilities at the Leidy and Tamarack (Pa.) fields** (PW—Oct.23 '59,p52).

New loops proposed would include 65.5 mi. of 30-in. line between Perulack, Pa., and Lambertville, N. J.; 39.6 mi. of 36-in. line from Lambertville to Linden, N. J.; 22.7 mi. of 20-in. line between the company's compressor station No. 25 and Chester Junction, Pa.; and 3.5 mi. of 30-in. line from Linden to Staten Island, N. Y.

In addition, Texas Eastern plans to build a 3,300-hp. compressor station at Perulack, and 81 mi. of 24-in. line from there to Leidy and Tamarack to move gas into and out of storage.

**Texas Eastern's new construction will help boost gas in storage at Leidy and Tamarack to over 60-billion cu. ft.**

Of the base storage, TET will supply some 15.2-billion cu. ft. Of the top storage gas, about 15-billion cu. ft. will be available to TET for sale.

**Transcontinental Gas Pipe Line Corp. and N. Y. State Natural Gas Co., both of which also have interests in Leidy and Tamarack, plan related projects to increase the capacity of the fields.**

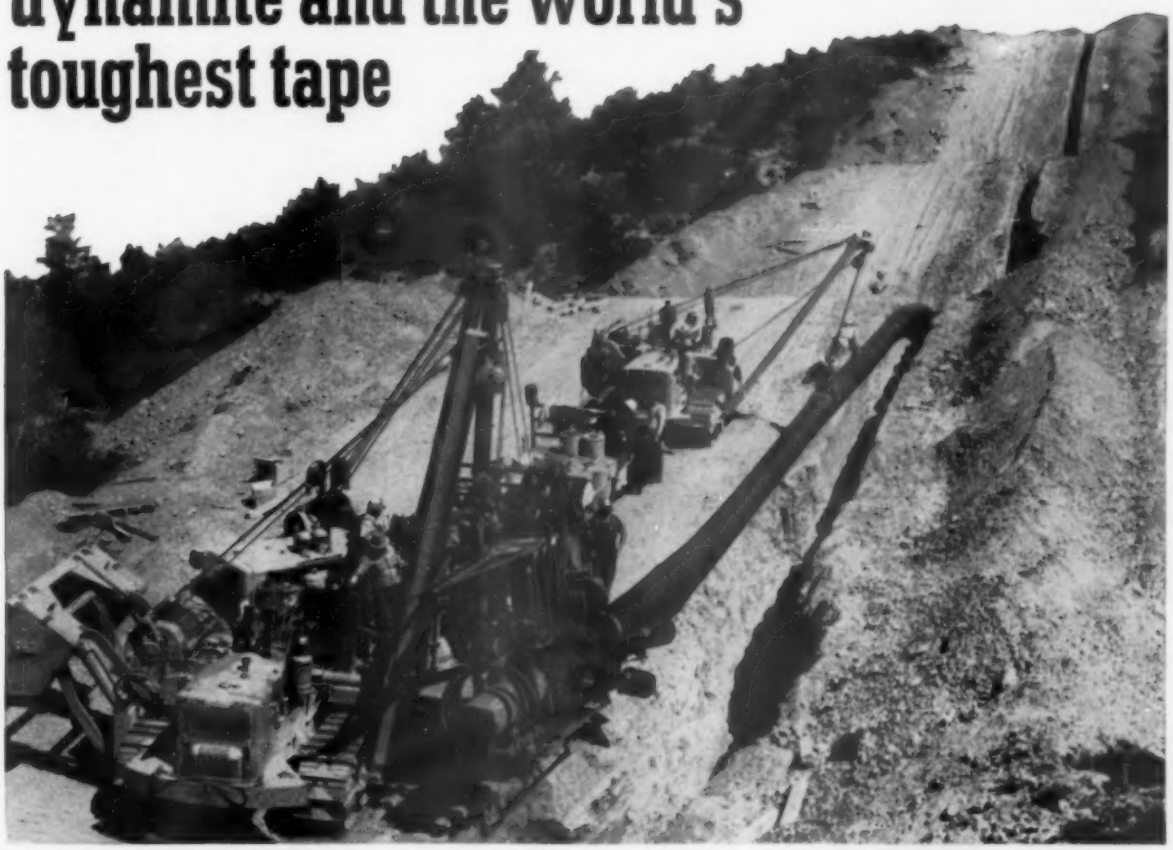
TET and Transco each owns a ¼ interest in the storage pools. N. Y. State Natural owns the remainder, and operates the entire storage project for itself and its partners.

A joint expenditure of $5.8-million

# Transwestern Line Nears Completion

**Transwestern Pipeline Co.'s new $191-million gas pipeline is being pushed through rocky country near Flagstaff, Ariz. The 30-in. line will run from West Texas to Topock, Ariz., on the California border, where it will deliver gas to** Pacific Lighting Gas Supply Co. It's scheduled for completion this summer. H. C. Price Co., which is building this section, reports that heavy wind storms have hampered construction, but indicates the deadline will be met.

# Jobs this rough need mountain climbers, dynamite and the world's toughest tape



## New Mandalay line protected by Polyken Extra-Strength #960

Putting in Richfield Oil's Mandalay Line was as mean a job as we've ever seen.

The line runs from sea level to points up to 8,300 feet in the mountains of Southern California, with grades over 40%. In places the trench was blasted out of solid rock. It took rugged crews to put the line in and a rugged tape to protect it.

On the recent big Florida Line and other lines in America, on lines in Canada and in Iran, Polyken has proven itself the most practical and economical protection you can put on a pipe.

Polyken tape pays off in performance—and in the currency of less men, less equipment, greater efficiency, more footage per day during construction. With tensioned-spindle equipment, pipe is cleaned, wrapped and over wrapped in one factory-smooth operation. Tape's ready. No primer, no drying or cooling, no fumes or fire hazard—none of those hot-dope problems.

Before you plan your next job, we'd like to tell you more about Polyken Extra-Strength #960. Call the Polyken distributor nearest you, or write Polyken, 309 West Jackson Blvd., Chicago 6, Illinois.

Polyken Tapes can be applied swiftly, easily, effectively, even under extreme conditions. This mountain-country coating went on with flat-country simplicity. That's why more contractors and pipeline managers are specifying Polyken.

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is planned by the three companies to enlarge the storage capacity of the fields. This expenditure would include a new dehydration plant with a capacity of 250-million cf/d of gas.

In addition, Transco proposes to build a new 6,000-hp. compressor station on its line near Leidy to increase its delivery capacity.

Still another allied project is that of Algonquin Gas Transmission Co. for 25 mi. of new line and additional compressor horsepower in New England to enable it to take over 75-million cf/d from TET.

# What's New / IN TRANSPORTATION

**About 75% to 80% of an initial throughput of 50,000 b/d proposed for the LP-Gas pipeline of Mid-American Pipe Line Co., has been "assured in letters of intent,"** according to an official.

Robert E. Thomas, president, added that maximum design capacity of the line, after the installation of additional pump stations, will be 85,000 b/d (PW—Nov.6'59,p120).

Other features planned for the line: underground storage facilities at McPherson, Kan. and Eunice, N. M., with total capacity of 300,000 bbl.; and remote control of nearly all operations from Tulsa.

•

**An 85-mi. products pipeline will be built from Helena to Great Falls, Mont., by Continental Pipe Line Co. and Husky Oil Co.**

The new 6-in. line will take products from the 10-in. line of Yellowstone Pipe Line Co. at Helena. Continental and Husky, together with Union Oil Co. of California and Interstate Oil Pipe Line Co., own the Yellowstone line, which links Billings, Mont., and Spokane, Wash.

•

**Standard Oil Co. (Ind.) says it has rejected a "preliminary proposal" to participate with Pembina Pipe Lines, Ltd., in an LP-Gas pipeline from western Canada to the U. S. Midwest** (PW—Apr.15'60,p42).

An Indiana Standard spokesman, says, however, that the company is still studying the possibility of partnership in such a line.

•

## Engineering

**Reynolds Metals Co. will build an aluminum barge of 12,500-bbl. capacity, which, it claims, will be the largest aluminum barge ever constructed.**

The vessel will be used by National Marine Service, of New York, for transport of chemicals that are especially sensitive to contamination by rust, such as alcohols, detergents, and edible oils.

In addition to the corrosion-resistance of aluminum, Reynolds says another advantage of its new barge is that its cargo capacity will be from 10% to 20% greater than the capacity of a steel barge of comparable size.

After "a few years service," the company asserts, the higher cost of the aluminum will be paid for by this increased carrying capacity.

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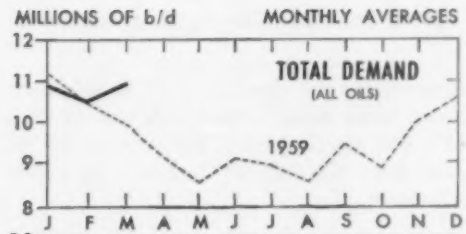
PETROLEUM WEEK'S

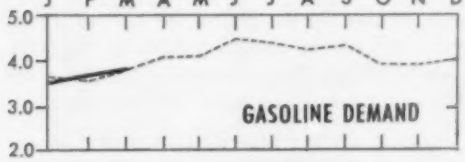
# Fingertip Figures




*Figures for period ended April 15, except as noted*

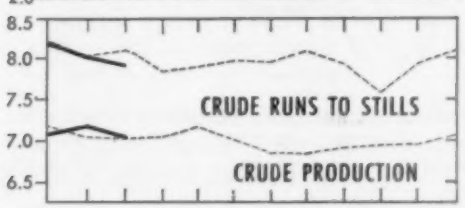
**TOTAL DEMAND**

| | |
|---|---|
| Latest 4-week average | 10.241 |
| Year ago | 9.475 |




**GASOLINE DEMAND**

| | |
|---|---|
| Latest 4-week average | 4.158 |
| Year ago | 4.102 |

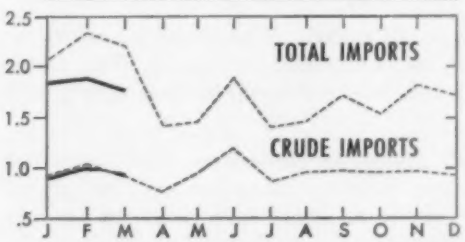



**RUNS TO STILLS**

| | |
|---|---|
| Latest week | 7.898 |
| Previous week | 8.035 |
| Year ago | 7.856 |

**CRUDE PRODUCTION**

| | |
|---|---|
| Latest week | 7.032 |
| Previous week | 7.028 |
| Year ago | 7.133 |

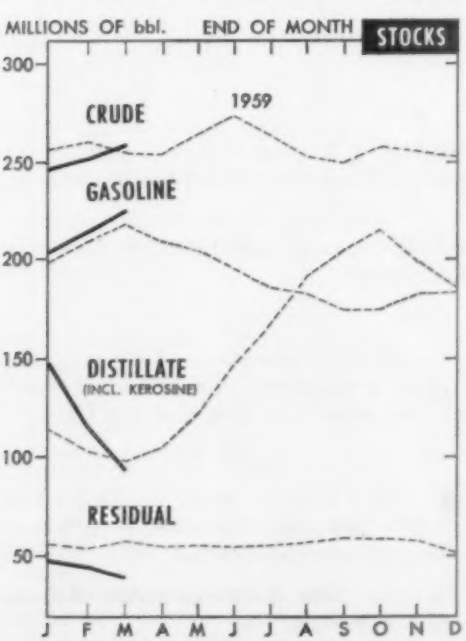



**TOTAL IMPORTS**

| | |
|---|---|
| Latest week | 1.896 |
| Previous week | 1.679 |
| Year ago | 1.115 |

**CRUDE IMPORTS**

| | |
|---|---|
| Latest week | 1.068 |
| Previous week | .752 |
| Year ago | .636 |




**CRUDE STOCKS**

| | |
|---|---|
| Week ended 4-9 | 256.2 |
| Previous week | 258.2 |
| Year ago | 253.9 |

**GASOLINE**

| | |
|---|---|
| Latest week | 224.8 |
| Previous week | 225.0 |
| Year ago | 212.7 |

**DISTILLATES**

| | |
|---|---|
| Latest week | 95.2 |
| Previous week | 92.6 |
| Year ago | 101.3 |

**RESIDUAL**

| | |
|---|---|
| Latest week | 39.1 |
| Previous week | 39.4 |
| Year ago | 56.4 |

**The latest cut in refinery runs could be an indication that refiners will keep throughput below the 8-million bbl. mark during the second quarter.**

Last week runs to stills were down 137,000 b/d from the week earlier. So far this quarter, runs have averaged 99,000 b/d lower than for the same period in 1959.

The decline to 7.9-million b/d in throughput is due partly to the fact that refiners want to avoid the serious oversupply situation that has plagued the industry. Another factor is the relatively tight crude supply—and it will get tighter. Because of the many cuts being made in allowables, heavy supplies of crude will not be available. And this will help keep refinery runs at a low level.

**Product inventories are still way out of line with industry's so-called "desired" levels.**

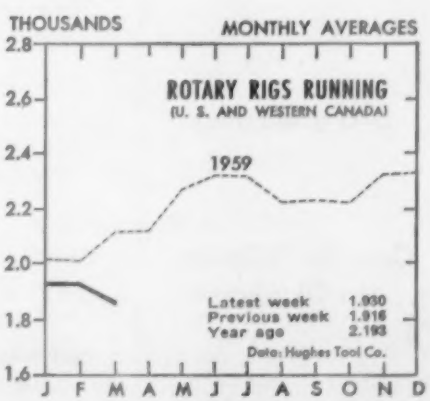
Gasoline inventories—which should drop substantially with the advent of warmer weather—were 224.8-million bbl. last week, almost 36-million bbl. higher than the target stock level for this time of year.

And despite the much publicized "shortage" of residual oils, stocks were 1.4-million bbl. above desired levels.

Stocks of distillates have begun their seasonal climb and are now at 95.2-million bbl. This is almost 10-million bbl. above what most companies consider a "safe" inventory level now.

**Crude stocks at latest report had fallen 2.1-million bbl. in one week. But the improvement may not last long.**

As of Apr. 9, they had reached a four-week low of 256.2-million bbl.—but still a hefty 6.4-million bbl. above the industry's target.



# The Market Trend

## Foreign Crude: No Seller's Market Now

**Some very revealing bids showed up in Montevideo last week.** Ancap, the Uruguayan oil agency, was looking for two cargoes of Kuwait-type crude. One cargo was needed for spring delivery; the second is slated for summer.

**It's hard to picture sharper competition for the supply of Middle East crude to a target 8,750 mi. from the home base.** Gulf's bid was $2.06 a bbl., delivered to Montevideo. Shell's was $2.07, with a discount of 1% to cover losses in transit. BP Trading held the "show" position at $2.08. Also-rans were Esso, Mobil, and Texaco.

**The payment terms were as competitive as the prices for the oil itself.** BP would accept sterling currency. Shell would accept dollars or sterling. Gulf was in dollars, but would accept 60% of the payment 180 days after the shipment, and 40% of the payment 12 months after the shipment.

**And the shipping rates will stagger all but the most intrepid of international traders.** Assuming a posted price of $1.67 a bbl. for Kuwait crude, the lowest bids are on the basis of tanker rates of 39¢ to 41¢ a bbl. This is about USMC—78%.

**It's here that international traders get out their pencils to figure what is the actual discount in the Persian Gulf.** So-called "going" ocean freight rates are about USMC—60%, or about 71¢ a bbl. That puts the discount on Kuwait crude at about 32¢.

**These are very rough prices on all counts.** A comparable gravity oil in Venezuela is posted at $2.55 a bbl. f.o.b. Similar-gravity West Texas sour crude would be up to $2.90 a bbl. before it could be loaded on a ship at the U. S. Gulf.

**And these prices will be likely guides for some term contracts about to be closed in South America.** Ancap is taking these two cargoes as trial balloons for its refinery expansion program. Brazil is negotiating for supply renewals at its big Cubatao refinery.

**Any way you slice it, it's a buyer's market for crude.**

### Black Sea to Montreal?

The puzzler this week is a tanker inquiry for consecutive voyages from Batoum or Novorossisk to Montreal. Trips are wanted for the months of May through September.

The requirement is for a dirty vessel, so the cargo isn't benzol. Is somebody going to bring Russian crude to Canada?

### LPG and Lubes:

Specialty products are moving in different directions. LP-Gas prices slipped 0.5¢ to 4¢ a gal. for Group 3 shipments. On the other hand, Mid-Continent and South Texas lube prices are firm and are rising.

### Gasoline Wavers In Oklahoma.

Oklahoma gasoline prices sank back 0.5¢ a gal. last week, to 11¢ for regular-grade. Refiners mourned the fact that their sales at mid-April were not much higher than they often are at mid-March.

Bad weather has been the trouble. Also, some sellers conceded that the 0.25¢ advance in early April was "premature."

# The Market Place

## AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All prices as of April 18

Bold face type indicates changes from previous week

### KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

#### Western Hemisphere

**U.S. Gulf Coast, cargoes**
- Gasoline, 98 oct prem....11.75-12.75
- Gasoline, 92 oct reg....10.75-11.5
- Kerosine....9-10
- Heating oil, No. 2....8-9
- Gas oil, 48-52 d.i....8.25-8.875
- Fuel oil, bunker "C"....$2.10-2.25

**Caribbean, cargoes**
- Avgas, Grade 100/130....14.75
- Gasoline, 93 oct research prem....11
- Gasoline, 87 oct research reg....10.125
- Gasoline, 79 oct research....9.375
- Gasoline, 70-72 oct motor method....9.25
- Kerosine....9.25
- Heating oil, No. 2....8
- Gas oil, 48-52 d.i....8.25
- Fuel oil, bunker "C"....$2.00

**New York Harbor, barges**
- Kerosine....9.8-10.3
- Heating oil, No. 2....8.8-9.3
- Fuel oil, No. 6....$2.47

**Okla.-Group 3, northern shpt., bulk**
- **Gasoline, 91 oct reg....11↓-12↓**
- Kerosine....9.125-9.625
- Heating oil, No. 2....8-8.25
- Fuel oil, No. 6....$1.50-1.70

**Chicago, bulk**
- Gasoline, 91 oct reg....11.5
- Heating oil, No. 2....8.75-10.35
- **Fuel oil, No. 6 high sulfur....7.15-7.4†**

**Los Angeles, rack**
- Gasoline, 88 oct reg....11.25-12.65
- Diesel fuel, PS 200....7.75-11.25
- Light fuel, PS 300....$2.80
- Heavy fuel, PS 400....$2.15-2.35

**Natural Gasoline, Grade 26-70**
- FOB Group 3....4.5
- FOB Breckenridge, Tex....4

**LP-Gas**
- **Propane, Oklahoma (Group 3)....(a)4↓-5**
- **Propane, Baton Rouge....(b)4.625↓-4.875↓**

**Pennsylvania Lubes**
- Bright stock, 25 p.t....23
- 200 vis. neutral, 25 p.t....27

**Mid-Continent Lubes, Tulsa basis**
- Bright stock, solvent, 95 v.i....25-26
- Neutral, solvent, 200-210 vis....21.5-22.5

**Gulf Coast Lubes**
- Bright stock, solvent, 95 v.i....25-26
- **Neutral, solvent, 200 vis....21.5-23†**

*(a) effective Apr. 13; (b) effective Apr. 15.*

#### Eastern Hemisphere

**Singapore (Pulau Bukom) cargoes**
- Avgas, grade 100/130....15.875
- Gasoline, 79 oct research....9.75
- Kerosine....10.125
- Gas oil, 48 d.i. minimum....9.5

### KEY PRICES—CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

#### Western Hemisphere

**United States (at the well)**
- Mid-Continent, (Okla.-Kan.), 36.0-36.9....$2.62-2.97
- North Dakota, 36.0-36.9....2.47-2.87
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9....3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9....2.92-3.22
  - West Texas, sweet, 36.0-36.9....3.00
  - West Texas, N.M., inter., 36.0-36.9....2.93
  - West Texas, N.M., sour, 32.0-32.9....2.71
  - East Texas, flat....3.05-3.25
  - **Mirando, 28.0-28.9....2.96↓-3.31**
- Illinois Basin, flat....3.00
- Pennsylvania Grade, Bradford dist., flat....4.55
- California, Signal Hill, 21.0-21.9....2.32†
- **North Louisiana-Arkansas, 36.0-36.9....2.72↓-3.02**
- Wyoming, sweet, 36.0-36.9....2.85-2.90
- Wyoming, sour, 32.0-32.9....2.63-2.71

**Canada (flat prices, at the well)**
- Pembina (Alta.)....$2.38
- Leduc-Woodbend (Alta.)....2.53
- Redwater (Alta.)....2.42
- Steelman A (Sask.)....2.435
- Virden (Man.)....2.30

**Venezuela (Cargoes, FOB lifting port designated)**
- Cumarebo, 47.0-47.9, Tucupido....$3.34
- San Joaquin, 41.0-41.9, Puerto la Cruz....3.10
- Oficina, 35.0-35.9, Puerto la Cruz....2.78-2.80
- Tia Juana, Medium, 26.0-26.9, Amuay....2.30
- Bachaquero, flat, Las Piedras....1.75-1.88
- Tarra, 38.0-38.9, San Lorenzo....2.83
- Lagunillas Heavy, flat, Las Piedras....2.10

*†Differential per deg. of grav. varies.*

#### Eastern Hemisphere

**Middle East, Persian Gulf (Cargoes, FOB lifting port)**
- Arabia, 34.0-34.9, Ras Tanura....$1.90
- Safaniya, 27.0-27.9, Ras Tanura....1.50
- Iran, 34.0-34.9, Bandar Mashur....1.86
- Iran, 34.0-34.9, Abadan....1.81
- Iraq, 35.0-35.9, Fao....1.80
- Kuwait, 31.0-31.9, Mina-al-Ahmadi....1.67
- Qatar, 41.0-41.9, Umm Said....2.05
- Neutral Zone, Burghan, 23.5-24.4, Mina Saud....1.51
- N. Zone, Eocene-Ratawi, 20.5-21.4, Mina Saud....1.38

**Middle East, Eastern Mediterranean**
- Arabia, 34.0-34.9, Sidon....$2.27
- Iraq, 36.0-36.9, Tripoli, Banias....2.31

**Far East, Cargoes FOB Lutong, Sarawak**
- Seria Light, flat....$2.57

### KEY TANKER RATES

(Last paid, per long ton, single voyage)

- U.S. Gulf-New York, clean....(USMC+5%) $2.99
- U.S. Gulf-New York, dirty....(USMC—10%) $2.57
- NWI-USNH, dirty....(USMC—50%) $1.38
- NWI-UK/Cont., dirty....(Scale—52½%) 15/7*
- **Pers. Gulf-UK/Cont., dirty (Scale—72½%) 13/5*↓**
- Persian Gulf-USNH, dirty....(USMC—70%) $3.81

**Sterling*

# Public Opposition Stalls Terminal

**A demonstration of how public opinion can hurt oil marketing is taking place on New York's Long Island today. Opposition there is so strong that it has practically ended all hopes for a vitally needed storage terminal,** which was to be constructed in an abandoned sand quarry in Port Washington North.

The hostility against the terminal points up a definite need for the industry to present a better picture of itself and its operations, some marketers feel.

In the minds of local residents, there has grown the spectre of oil scum polluting the waters and killing the fish. Along with this, the residents of Port Washington North and nearby Sands Point fear the danger of fire and explosion and the increase in the number of heavy tank trucks, creating traffic hazards.

Anticipating what they believe will be rowdy tanker crews, local residents expect the decorum of their villages to be disturbed, while the throbbing of tanker pumps will be heard from offshore.

And at the storage terminal, the residents believe, the air will be contaminated with the odors of oil.

Proponents say all of these fears are groundless—but they can't convince the residents.

**The proposed terminal that is the object of all this latent opposition is a $5-million project that was originally planned in 1957 by Lewken Corp.**

The company is jointly owned by two Long Island oil marketers, Harvey W. Lewis (president of Lewis Oil Co.) and William F. Kenny, Jr., (president of Meenan Oil Co.). Kenny is prominent in the National Oil Jobbers Council, and is chairman of the jobbers' Fuel Oil Committee.

Late last month, Lewis withdrew his interest in the project, bowing to the pressure of public opinion and (what was more effective) a threatened boycott by many of his customers in Sands Point.

Besides Kenny's supplier (the Esso Standard division of Humble Oil & Refining Co.), Gulf Oil Corp., Shell Oil Co., and Mobil Oil Co. had planned to use the terminal for both fuel oil and gasoline.

**The need for this terminal is dramatically underscored by the growing demand on Long Island, which has already overburdened existing storage facilities.**

One of the fastest-growing counties in the country, Nassau County, in the center of Long Island, is still predominantly a fuel oil market, despite the inroads of natural gas (PW—Dec. 4'59,p59).

But the supply situation is so acute that Hofstra College, on Long Island, after a recent study, declared that a local refinery is the only way to meet the growing demand for both fuel oil and gasoline.

**Frequently, Long Island marketers find themselves with less than 24 hours of supplies in their storage tanks,** says Kenny. In March, when a sudden cold wave caught many marketers waiting for a price drop in No. 2 fuel, there were many apprehensive moments until barges arrived to restore supplies, Kenny notes.

For most of central Long Island, barge transportation is one of the chief methods of bulk delivery. If the 36-day tug and barge strike of 1957 were to recur, many oil men say, "there would be hell to pay."

But the residents of Port Washington North and Sands Point shrug off this warning: "Let natural gas supply the extra energy," they say.

But even when and if public opinion were to be aroused against natural gas, the utilities could invoke their right of eminent domain, says Kenny; oil men don't have this right.

**Critics of the proposed terminal have attacked practically every aspect of the project, and the public has generally been aroused by newspaper editorials, letters to the editor, and unfavorable news stories.**

John J. Theobald, superintendent of New York City's public schools and a resident of Sands Point, warned his neighbors at a recent civic meeting that the terminal would cast "a halo of blight" on their fashionable suburb.

Before such attacks were leveled at the terminal, a survey of 825 Sands Point homeowners revealed that only one resident was completely opposed. But today, even those who see the need for the terminal seem unwilling to associate themselves publicly with the unpopular proposal.

**Each criticism of the project has been answered by its proponents with detailed explanations of how the terminal would affect nearby communities.**

Lewken opened a center in Manhasset and invited residents to call in for information about the terminal.

Last month, to answer the traffic criticism (which he believes to be the most crucial), Kenny had his trucks driven through the busiest intersection of Port Washington North at the rate of one a minute—the average rate expected for the terminal.

Later, he turned up at a meeting of the Greater Port Washington Civic Council with a film of the traffic, proving that his trucks would not create congestion.

On oil spills, Kenny assured yachtsmen and bathers that there would be no pollution resulting from the discharge of products from tankers. Unfortunately, however, many residents

**THIS EXHAUSTED SAND QUARRY in Port Washington North, L. I., is the proposed site for a controversial 22-tank oil storage terminal, sponsored by Lewken Corp.**

were reminded of a spill of No. 6 fuel oil that took place at Northville, on eastern Long Island. Despite Kenny's insistence that his terminal would be handling only light oils, he found it difficult to overcome the deep-seated memory of residual oil blackening the beaches. "Oil is oil, isn't it," was one significant reaction.

Even the one big point in the terminal's favor—the tax revenue that it would generate for local residents—has not helped it in the eyes of these residents, despite their eagerness to lighten their own tax burden through an expansion of industry.

**Tankers would be moored 3,800 ft. off Sands Point, L.I., (beyond established lanes for boat racing), at a location approved by the U.S. Army Corps of Engineers.**

Protected from heavy seas by a natural cove, the tankers would unload into two 20-in. pipelines buried 3 ft. under the bed of Half Moon Bay. (In Northville, heavy seas and unanchored pipelines were the two causes for the break that occurred in the line, Kenny says.)

From the bay, the pipelines would lead underground (and out of sight) along Sands Point Road to 22 storage tanks, located on 57 acres of abandoned sand pits (picture). Unlike refineries, Kenny insists, the terminal would not give off any odors.

About two tankers a week during the winter, and two or three a month in the summer, would unload up to 9-million bbl. of gasoline, kerosine, and No. 2 heating oil a year. Their operation would be so silent they would not be heard on shore, Kenny says.

An important advantage of the terminal, Kenny has said, is that it will replace some of the heavy barge traffic which now plies Long Island.

**Before the terminal project can be begun, a variance for storage tanks must be secured, plus an easement for underground pipelines.**

For these, Kenny must apply to the zoning board in Port Washington North and the board of trustees of Sands Point. Neither application need be directly sanctioned by public approval, and the proposed storage area has already been zoned for heavy industry. But Kenny says he is unwilling to apply to either board for approval until the public fully understands his project.

If he fails to get approval for his project, Kenny says he would have to look farther east for an alternate location. But no other area is so well suited for a deep-sea terminal, nor offers so central a location for tank-truck distribution, he says.

# What's New / IN MARKETING

**A bill that would require the licensing of service station dealers and employees is under discussion in the Business Affairs Committee of the New Jersey legislature.**

The bill's only purpose is to improve automobile maintenance work at service stations, says R. E. Frederick, one of the two assemblymen who introduced the legislation.

In addition to licensing, the bill would require inexperienced employees to work certain periods of apprenticeship.

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**A mass rapid-transit system has been recommended for Los Angeles, to relieve the city from its congestion of automobile commuters.**

Daniel, Mann, Johnson & Mendenhall, a local engineering and architectural firm, has prepared plans for a 110-mi. network to be completed by 1980, with an initial 43.5-mi. system to be built over a five-year period.

Equipment hasn't been selected yet.

**Texaco Inc.'s toy tank truck was the best premium offered in 1959, says the Premium Industry Club.**

The club awarded Texaco the "Oscar" of the premium industry for the $7.95 toy, which Texaco offered through its service stations for $3.50.

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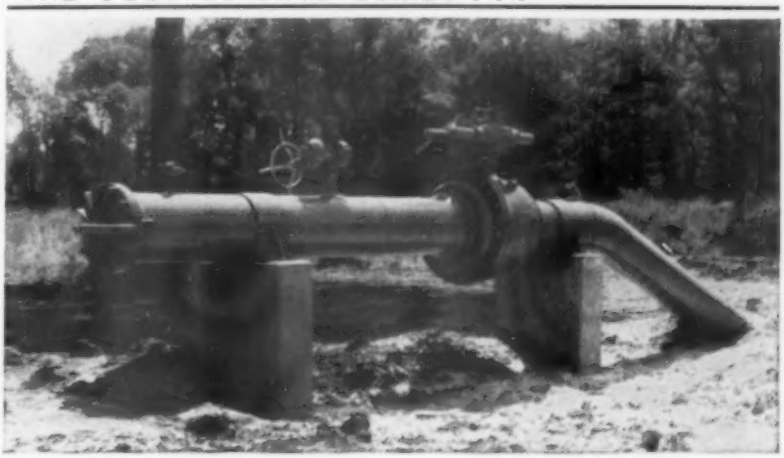
## Engineering

**The annual cleaning of oil-burning equipment can be eliminated through the use of its new "Watchdog" burner, says Esso Standard division of Humble Oil & Refining Co.**

Esso says its burner needs to be cleaned only once every three years. Clean operation is achieved partly by delaying oil flow until an air fan has had time to reach maximum running speed, assuring sufficient air for combustion. The fan also continues running until shortly after oil flow has stopped. The usual yearly maintenance check is recommended.


THE COST CUTTING SERIES . . .



**New Design Pipeline Valve is LUBRICATED**

The Rockwell Hypresphere valve on a Louisiana scraper trap (above) has a full round opening that allows easy passage of all types of scrapers. It also has all the advantages of a lubricated plug valve . . . positive shut-off, quarter-turn closure and a fully protected lubricant seat. Six years of field tests have demonstrated to pipeline engineers that the Hypresphere stays leakproof and trouble-free on petroleum, crude, product and gas transmission lines. Maintenance costs are cut to a minimum, with only two moving parts in the Hypresphere, and lubrication prevents metal-to-metal wear. For complete information on the Hypresphere or full line of Rockwell-Nordstrom valves, write:

**ROCKWELL MANUFACTURING COMPANY**
PITTSBURGH 8, PA.

## DEPT/Personals

R. Warner

R. L. Milligan

**ROBERT L. MILLIGAN**, president of Pure Oil Co., will take over the responsibilities of chief executive officer of the company, on May 2, from **RAWLEIGH WARNER**, who continues as chairman. Milligan, with Pure since 1929, was elected treasurer in 1947, and vice-president in 1949. He became executive vice-president in 1951, a director in 1952, and president in 1954. Warner joined Pure in 1926 as vice-president and treasurer; he became chairman and chief executive officer in 1947.

**SIR STEPHEN GIBSON**, formerly managing director of Iraq Petroleum Co., Ltd., is now chairman of Woodfield Pickering, Ltd.

**BENJAMIN TYRAN** has organized a new company called International Petroleum Supply Co., in Newark, N. J., which will engage in the worldwide purchase and sale of crude and products. The new company will serve producers as well as refiners and marketers. Tyran was formerly general sales manager in charge of both domestic and international sales for American Independent Oil Co. While with Aminoil, he served as a director of Iricon Agency, London, and of Frisia Refining Co., Emden, Germany.

**HAYLETT O'NEILL, JR.**, becomes general manager of the purchasing department for the Esso Standard division of Humble Oil & Refining Co. He succeeds **A. J. Kelly**, who is retiring. O'Neill transfers to New York from Houston, where he has been purchasing agent of the Humble division. **B. A. Warren**, who has been assistant general manager of Esso's purchasing department, succeeds O'Neill in Houston.

**WILL FRANK** has been elected vice-president of Austral Oil Co., Houston. He will be in charge of the drilling and production department, and will be under the supervision of **C. Wardell Leisk**, executive vice-president. Frank joined Austral in 1956 as general superintendent.

**WEBB B. COOLEY** is the new manager of Mobil Oil Co.'s southwest ad valorem tax area, with offices in Dallas. He will be responsible for property tax work for Mobil's producing, marketing, and manufacturing operations, and for Magnolia Pipe Line Co. operations, in 15 states. Cooley was formerly ad valorem tax manager for Magnolia Petroleum Co., in Dallas.

**M. R. BRIDGEMAN** has been named chairman of British Petroleum Co., Ltd., succeeding **Sir Neville Gass**, who retires on June 30. At the same time, **J. M. Pattinson** was named deputy chairman, and **A. L. Banks** was named to succeed Gass as a BP director.

**CHARLES W. VISSER** is the first honorary member of the Canadian Assn. of Oilwell Drilling Contractors. Visser was honored "in recognition of services rendered for the progress and development of the petroleum industry." He retired as head of drilling operations in the Western division of Imperial Oil Ltd. last year.

**DONALD M. COX** moves to Houston as manager of supply and distribution for Humble Oil & Refining Co. He was formerly general manager of the supply department of Humble's Esso Standard division, with offices in New York. **Clifton C. Garvin, Jr.**, assistant general manager of Esso's supply department, succeeds Cox as general manager.

D. M. Cox

P. M. Crandall

**PAUL M. CRANDALL** has been named vice-president of La Gloria Oil & Gas Co., Houston, subsidiary of Texas Eastern Transmission Corp. He will also be assistant to the senior vice-president in charge of the parent's oil division. Crandall has been La Gloria's comptroller since 1958.

**M. D. MAUCK** has been named manager of exploration of the new southern division of Pure Oil Co., which will be set up in Houston late this summer. He is currently exploration manager, at Ft. Worth, for the Texas producing division, which will become part of the southern division. **L. L. McDonald**, assistant division manager in Ft. Worth, will be manager of operations in Houston, and **Jack W. Boothe**, assistant secretary-treasurer of Woodley Petroleum Co., Houston, will be manager of services. Area superintendents in the new Houston operations section will be **C. C. Brown**, currently assistant to the Gulf Coast division manager for operations, Houston; **W. F. Schafer**, production superintendent for the Texas producing division, Ft. Worth; and **D. L. Proctor**, district superintendent of the Van (Tex.) joint account.

**J. FRENCH ROBINSON** and **JOHN M. HARBERT III** have been elected directors of Houston Corp., St. Petersburg, Fla. Robinson was president and a director of Consolidated Natural Gas Co., New York, from 1943 to 1951, and was chairman until his retirement in 1955. He is currently executive consultant to Republic Steel Corp., in Cleveland. Harbert, in 1954 joined the original group planning to bring natural gas to Florida, and became a founding stockholder of Houston Corp. He is president of Harbert & Cargil, Inc., and of Harbert Construction Corp., both in Birmingham, Ala.

**H. FRANK BROWN** becomes manager of Shell Oil Co.'s public relations department, with offices in New York. He succeeds **G. Gordon Biggar**, who has been named vice-president of public relations. Brown was formerly manager of Shell's visual aids division.

**GUY V. MALLONEE** is the new assistant manager of the New York sales division of the Esso Standard division of Humble Oil & Refining Co., at Pelham, N. Y. He succeeds **James T. Outz**, who has been on special assignment for several months and is now manager of Humble's new Ohio division. Mallonee was formerly manager of service-station development at Esso's headquarters in New York City.

**F. N. MANN** is the new manager of Atlantic Refining Co.'s purchasing department, in Philadelphia. Mann, most recently director of Atlantic's marketing personnel division, succeeds **J. S. Parks**, who is retiring.

**DONALD D. DAVIDSON**, manager of manufacturing for Golden Bear Oil Co., Los Angeles, has been elected a vice-president. He joined Golden Bear in 1952 as chief engineer, after 14 years with the Shell Oil Co. organization.

**DR. KENNETH A. WEST** has been appointed vice-president of Canadian Oil Companies, Ltd., with offices in Toronto. West, formerly manufacturing manager, will continue to be responsible for the administration of that department, and will also direct the company's supply and transportation and purchasing departments. He is also a member of the company's management committee.

K. A. West

F. G. Crosby

**FRED G. CROSBY** becomes vice-president of Sun Oil Co., Ltd., Toronto. He joined the company in 1931, and was elected a director last year. In 1956 he became general sales manager, a position he continues to hold.

**W. E. SCHOENING** moves to New York to fill the newly created position of manager of marketing development for American Oil Co. He was formerly district manager at Jefferson City, Mo., for Amoco's parent, Standard Oil Co. (Ind.). In his new position, Schoening will report to **C. H. Coughlin**, Amoco's marketing vice-president.

W. E. Schoening

W. S. Felmly

**W. S. FELMLY** has been promoted to assistant traffic manager at Shell Oil Co.'s head office, in New York. He will be responsible for all transportation equipment and services and for relations with for-hire carriers, east of the Rockies. He succeeds **R. J. Sullivan**, who has been transferred to the West Coast. Felmly has been supervisor of chemical rates in the traffic department since 1954.

**C. W. BATES, H. T. CAMPBELL,** and **C. T. JONES** have been promoted to senior supervising engineers in the technical division at Humble Oil & Refining Co.'s Baytown (Tex.) refinery. Bates is in charge of the control systems engineering section, and Campbell heads one of the mechanical engineering sections. Jones is currently serving on a rotational assignment as head of the cost evaluation division in Humble's Houston office.

**RICHARD E. KERESEY** is the new general counsel, and **Charleton H. Endemann** succeeds him as associate general counsel, for the Esso Standard division of Humble Oil & Refining Co., with offices in New York. Keresey joined Esso's law department in 1955 after serving as assistant to the president of W. R. Grace & Co. Endemann joined Esso's law department in 1945.

**J. S. DETWEILER** has been appointed oil planning division manager for the manufacturing department of Standard Oil Co. of California, Western Operations, Inc., San Francisco. He succeeds **F. R. Marshall**, who is retiring after 40 years with the California Standard organization. Detweiler joined Standard in 1934 as a member of the research and development division. In his new position, he is in charge of formulating operating programs for Western Operations' manufacturing department.

**RALPH CORMANY**, of Signal Oil & Gas Co., Los Angeles, is the candidate for the presidency of the American Assn. of Petroleum Landmen. Election of the association's officers will be conducted by mail before June, when the new officers begin their one-year term at the close of the 1960 convention. Other nominees for offices in the association are: **George R. Bixler**, BBM Drilling Co., Houston, for first vice-president; **Emmett Williams**, Cities Service Oil Co., Roswell, N. M., for second vice-president; **Ned Gilbert**, Sun Oil Co., Calgary, for third vice-president; and **Dudley Couvillon**, The California Co., New Orleans, for treasurer.

**CHARLES W. HENNING** has been appointed Colorado division manager of the Rocky Mountain Oil & Gas Assn., at Denver. He succeeds **Earl Wennergren**, who has accepted a position with Sinclair Oil & Gas Co. in Tulsa. Henning has been with KOA Radio and TV, in Denver, since 1956.

**DAVID L. EYNON, JR.**, has been elected chairman, and **John A. Scott** president, of the newly formed Sinclair-Koppers Chemical Co., jointly owned by Sinclair Oil Corp. and Koppers Co. Other officers of the new company are: **C. W. Hardell** and **Carl H. Pottenger**, vice-presidents; **John M. Crimmins**, secretary; **Hardell, T. C. Cochran**, and **J. Von Bevern**, assistant secretaries; and **R. H. Hein** and **K. C. King**, assistant treasurers and assistant secretaries. The new company plans to build a petrochemical plant in Houston for the production of styrene monomer, a chemical used in the manufacture of plastics, synthetic rubber, latex, and other products.

**JOHN T. OXLEY** has been elected executive vice-president of Union Texas Natural Gas Corp., which resulted from the merger of Union Oil & Gas Corp. of Louisiana and Texas Natural Gasoline Corp. Four senior vice-presidents are **Frank B. Markle, Wayne V. Jones, Daniel B. Lovejoy,** and **R. C. Frederick**. Other officers of the new company are: **Maxwell L. Euwer**, vice-president, producing operations; **Harold G. Teverbaugh**, vice-president, plant operations; **Elliott H. Powers**, vice-president, exploration; **O. M. Bailey**, vice-president, marketing; **Claude C. Harris, Jr.**, vice-president and controller; **W. P. Wyrick**, vice-president; and **Donald K. Hawes**, secretary and treasurer. Oxley, Frederick, Teverbaugh, Bailey, and Wyrick will be located in Tulsa, and the other officers will continue to be located in Houston.

**VERNER JONES** assumes a one-year assignment as exploration manager of Mobil Oil of Canada (Libyan Branch), in Tripoli, Libya. He succeeds **Roland W. Garwood**, who transfers to Mobil Oil de Venezuela. After his special assignment, Jones will return to his current position as exploration manager in the corporate exploration and producing department of Socony Mobil Oil Co., in New York.

**EUGENE HOSFORD**, operations coordinator for the domestic production department of Gulf Oil Corp., Houston, is the new state chairman of the Oil Information Committee of the Texas Mid-Continent Oil & Gas Assn. Hosford, formerly state OIC vice-chairman, succeeds **K. H. Shaffer**, who is moving to New Orleans as president of The California Co. **Herman P. Pressler**, vice-president of the Humble division of Humble Oil & Refining Co., succeeds Hosford as vice-chairman.

**JOHN F. MERRIAM** has been elected to the newly created position of chairman of Northern Natural Gas Co., Omaha, Neb. Merriam was formerly president of Northern, and has been a director since 1946. At the same time, **Max A. Miller**, a director of Northern for 17 years, was named to the newly created position of vice-chairman.

**CHARLES R. CANFIELD** has been named to the newly created position of regional geologist on the general office exploration staff of Pan American Petroleum Corp., in Tulsa. Canfield has been division geologist for the company's central division, at Oklahoma City, for the past eight years.

**GUY E. CAMPBELL** has been named acting division manager of Sun Oil Co.'s Mid-Continent division, at Tulsa, succeeding the late **George W. Chapman**. Campbell was most recently head of the land department in the Mid-Continent division. **Jack G. McQueen** has been named acting manager of the land department, succeeding Campbell. McQueen has been assistant manager of that department since 1955.

**O. C. CLIFFORD, JR.**, is foreign exploration manager of Atlantic Refining Co.'s new department for foreign exploration and production operations, in Dallas. The new department will direct all phases of Atlantic's overseas operations except in Venezuela, where it has a separate organization. Clifford, with Atlantic since 1936, was most recently manager of the foreign exploration division.

O. C. Clifford, Jr.

R. M. Davis

**RICHARD M. DAVIS** becomes exploration manager of Mid-America Minerals, Inc., Oklahoma City. Davis has been manager of Mid-America's Rocky Mountain division office, at Denver, for the past 17 months. Davis resigned from Carter Oil Co. in 1958, and later that year opened the Rocky Mountain office for Mid-America.

**LEO C. GRAVIS** moves up to manager of exploration for Trunkline Gas Co., Houston. He has been chief geologist since he joined the company in 1956. In his newly created position, Gravis will be in charge of Trunkline's geological, land, and geophysical activities.

## DEPT/Service & Equipment Companies

**J. T. KENNEALLY** is the new president of Houston Oil Field Material Co., Houston. He succeeds **Hugh Q. Buck**, Houston attorney, who has been serving as temporary Homco president since 1958. Buck moves up to Homco chairman. **Frederick W. Richmond**, New York, becomes chairman of the executive committee, and **C. L. Roach**, vice-president for domestic production, becomes a director. Kenneally was formerly associated with Richmond's financial interests in New York, and earlier with E. F. Hutton, investment bankers, and Northern Trust Co.

H. S. Gleason

J. T. Kenneally

**HOWARD S. GLEASON** has been appointed assistant to **George A. Peck**, president of Southwestern Industrial Electronics Co., Houston, one of the Dresser Industries. Gleason, who was formerly associated with Stromberg-Carlson Co., served under Peck there as assistant general manager of the electronics division. Gleason has also been manager of the automation and marketing departments in Stromberg-Carlson's electronics division, and product manager of its digimatic numerical control systems.

**W. LEO CYPHER** is the new district sales manager in the Rocky Mountain area for the Baash-Ross division of Joy Mfg. Co., with headquarters in Denver. Cypher, with Baash-Ross since 1937, was most recently special sales representative covering domestic and foreign areas at the Long Beach (Calif.) office.

E. G. Murphy

J. T. Roberts, Jr.

**E. G. (Spud) MURPHY** is the new western region sales manager for Delta Tank Mfg. Co.'s oilfield equipment division, and **J. T. ROBERTS, JR.**, is the new eastern region sales manager. Murphy will direct Delta's newly expanded sales and service activities in the Mid-Continent and Rocky Mountain areas from headquarters in Houston. Roberts will be in charge of the company's sales activities in Louisiana, Mississippi, and Alabama, with offices in Lafayette, La. Murphy has been manager of several manufacturing companies, and has been an independent operator. Before joining Delta earlier this year, Roberts had served in managerial capacities with other petroleum equipment companies.

**EARL B. MARRS** is manager of Midwest Piping Co.'s new Tulsa office for sales of welding fittings, piping fabrication, and erection, in Oklahoma, Arkansas, and Northwest and West Texas. Marrs was formerly manager of Walworth Co.'s Tulsa sales offices.

**ROBERT F. (Pete) HOLCOMB** has joined the sales staff of Crossett Chemical Co., at Crossett, Ark. The company manufactures and markets Seeco-Mul, a drilling mud additive.

**WALTER A. ANDERSON**, resident manager of Procon (Canada), Ltd., Toronto, has been elected vice-president. Anderson joined Universal Oil Products Co., parent of Procon, in 1934. He transferred to Procon, Inc., as chief estimator in 1953, and became resident manager of the Canadian company in 1955.

W. A. Anderson

W. L. Laflin

**W. L. LAFLIN** is manager of the new Gulf Coast division of Welex, Inc., at Houston, which combines the Louisiana Gulf Coast and Texas Gulf Coast divisions. Laflin was formerly head of the Louisiana Gulf Coast division, at New Orleans. **W. R. Marshall**, formerly sales engineer, becomes division operations manager at Houston. Three district managers within the new division are: **Gilbert Hester**, formerly Houston sales engineer, now district manager there; **G. E. Johnson**, formerly shooter at Alice, Tex., now manager at Corpus Christi; and **J. R. Evans**,

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formerly sales engineer, now manager at Alice. **C. E. Eicke** was promoted from logging operator to sales engineer at Houston; **R. K. Riggle** from Mission (Tex.) field engineer to Beaumont sales engineer; **C. F. London** from field engineer to assistant district manager at Alice, and **W. R. Riggan** from Lafayette (La.) field engineer to assistant district manager at Victoria. **R. H. Huddleston** has been named manager of research and engineering at Welex's research and engineering center, at Houston. He was formerly senior development engineer there.

**ROBERT G. BUTTERWICK** is the new advertising and sales promotion manager of Minneapolis-Honeywell Regulator Co.'s industrial systems division, at Beltsville, Md. The division, formerly known as Davies Laboratories, is a producer of analog and digital systems using magnetic tape as a data collecting and storage medium. Butterwick has been with the company since 1951.

R. G. Butterwick

S. L. Stentz

**STURGIS L. STENTZ** becomes manager of the systems division of Sargent Engineering Corp., with headquarters in Huntington Park, Calif. His background has been in the design of large-scale and complex systems, including completely automated oil production leases. He has been associated with over 40 such leases.

**FELIX B. PROBANDT** has joined Pipe Line Technologists, Inc., Houston, as secretary and treasurer. He was formerly with the tax department of Peat, Marwick, Mitchell & Co.

**JOHN L. YOUNG** has been appointed vice-president, engineering technology, of United States Steel Corp., Pittsburgh. He will be involved in foreign and domestic engineering developments. At same time, **J. D. Rollins** will take over the appropriations activities previously directed by Young. Rollins' title will be changed to vice-president, facility planning and appropriations.

**H. A. DIETRICH,** vice-president and manager of Burgess-Manning Co.'s industrial silencer division, transfers to Dallas from Libertyville, Ill., former headquarters for the division. **Carl Read, Jr.,** the company's office manager in Dallas, has been appointed advertising manager for the division. **A. P. Gallagher** has been promoted from chief engineer to engineering coordinator for the division, at Dallas, and **Bill Golden** from application engineer to chief application engineer there. Gallagher has been with the company since 1954, and Golden since 1957. **Edmund J. Halter** recently joined the company as chief development engineer in charge of the division's research and development program in Dallas.

**ROBERT W. SNIPES** has been appointed sales manager of Engineering Supply Co., Dallas, regional distribution subsidiary of Texas Instruments Inc. Snipes has been manager of Esco's electronics department for three years, and in sales for six years. Engineering Supply distributes electronic, industrial, power transmission, and safety and geophysical supplies throughout the Southwest from its offices in Dallas and Tulsa.

**BOBBY D. GRAHAM** moves to Bakersfield, Calif., as field representative of the Oil Well Supply Division of U. S. Steel Corp. He was formerly field representative for the division at Taft, Calif.

**W. M. FITZGERALD** is district manager of a new Beaumont (Tex.) store recently opened by Brown Oil Tools, Inc. A complete line of service equipment and production equipment will be maintained at the store, and all regular Brown services will be available, including fishing, production packers, liner service, and testing.

**ROY W. JOHNSON** is the new manager of contract sales for Keenan Pipe & Supply Co., Los Angeles. For the past two years, he has been vice-president of Culbert Pipe & Fittings Co., Jersey City, N. J. He is also a former executive vice-president of Republic Supply Co. of California, Los Angeles.

**J. FRANK KELLER** is the new vice-president in charge of public relations for Delta Tank Mfg. Co., with offices in New Orleans. He was formerly associated with J. Ray McDermott & Co., New Orleans.

**EARL BARKLEY** is the new sales manager of the newly formed Rocky Mountain area of the Baash-Ross division of Joy Mfg. Co., at Denver. He was formerly in charge of the Baash-Ross office covering the Dallas-Ft. Worth district. The division's district offices at Casper, Wyo., and Farmington, N. M., have become part of the new area.

**PAUL HANSEN** has been appointed regional sales manager for the international division of Wilson Supply Co., with offices in Houston. He will be associated with **Wayne Harris,** head of Wilson Supply International's Latin America sales operations. Hansen comes to Wilson from ITEC SRL, Buenos Aires, where he was sales manager of oilfield supply operations. Before his oilfield sales experience in South America, Hansen spent five years in North Africa with a Swedish drilling company.

**KENNETH H. DAY** and **L. DON DODSON** have been named to newly created positions of assistant sales managers of Lubrication Engineers, Inc., with headquarters in Ft. Worth. Day will be in charge of sales territories east of the Mississippi River, and Dodson will serve the Western half of the United States. Day joined the company in 1958 as a member of the credit department. He was most recently on special assignment for the company in the East. Dodson, who joined the company in January, was formerly director of industrial development for the Abilene (Tex.) Chamber of Commerce and, before that, manager of the Grand Saline (Tex.) Chamber of Commerce.

L. B. Levell

C. H. Hickman

**L. B. LEVELL** is the new vice-president-area manager of Mid-Continent Supply Co.'s southern area, at Houston, and **C. H. HICKMAN** is the new vice-president-area manager for its central operating area, at Tulsa. Levell has been vice-president of Mid-Continent Supply Co. of South America, S. A., in Buenos Aires, and Hickman has been Tulsa division manager since last year. **Robert L. Walters,** formerly sales representative at Mid-Continent's Ft. Worth headquarters, succeeds Levell in Buenos Aires.

**EARL McGILL** assumes the newly created position of assistant to the director of sales for Skinner Bros. Co., with offices in Dallas. For the past five years he has been Skinner's field sales representative in the Permian and Delaware Basins. In his new position, he will be responsible for the development of new contracts for the molding of rubber products and components at the company's facility in Dallas, and will assist **W. E. Esslinger,** director of sales, in the management of the company's field representatives.


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the box number when answering advertisements. It's the only way we can identify the advertiser to whom you are writing.

# Gas Bill's Chances Are Hurt Again

POLITICS AND PUBLIC OPINION being what they are, the recurring tempests over the Federal Power Commission certainly aren't going to help natural gas producers get remedial legislation this year. Or any other year, as far as that goes.

It could well be that the ruckus blossoming out from the Midwestern Gas Transmission case might be just enough to upset the applecart again, and foredoom the valiant uphill fight for a gas bill that the Independent Petroleum Assn. of America is spearheading.

Technically, the Midwestern case and the natural gas relief bill are different affairs. But both involve gas regulation and FPC. Thus, the implications and after-effects of the Corcoran conversations, including the widening FPC probe itself, could make a remedial measure for the natural gas industry politically untouchable, no matter how much it is needed.

The aftermath of the Corcoran talks already has put Rep. Oren Harris (D.Ark), a friend of the industry, over the barrel. He doesn't go along with the contention that off-the-record approaches to a federal regulatory agency are accepted or acceptable practices. Thus, as chairman of the House subcommittee investigating federal agencies and improper influence, he has found it necessary to broaden his FPC inquiry as a matter of principle.

IT'S IRONIC that a friend of the industry is caught in such a situation. But then, the gas transmission people apparently have the same facility as the gas producers for stubbing their toes. This is not meant to be a snide crack at either group; merely an unhappy commentary on related facts.

It can be safely assumed that opportunists in Washington and elsewhere, and opponents of natural gas relief legislation, will make capital out of the present situation—and anything else that might come out of the probe that could be construed as derogatory or controversial. This is an election year, and everybody likes to be on the side of goodness and right, and a defender of the lowly consumer.

IT ALL ADDS UP to another wave of unfavorable newspaper clippings, editorials, commentaries, and speeches, all of which, in the long run, can't help but affect public opinion adversely. It would be wonderful if the IPAA drive for a natural gas bill could reach fulfillment. But, as we've said before, the chances were already slim, and things like this only make them slimmer.

## "BROWN CAM-LOK" PROFIT PACKING PACKER

It's a fact the Brown Cam-Lok does more for your money — packs more profit when production totals are in.

*Here's why:*

Use Cam-Lok as a packer during the flowing life of your well. When the well goes on the pump, convert Cam-Lok to a tubing anchor while you are working over the well and run it back. Thrifty? You bet it is!

*and positive, too . . .*

Cam-Lok is the most controllable mechanical packer you can put in your well.

Less than one quarter turn of the tubing in either direction operates the unique Brown cam mechanism, to grip the casing like a pipe wrench working from the inside. This wrench grip, not friction springs or blocks, will lock the packer in place as long as torque is held in the tubing — to permit lifting or slack-off of the tubing to set or release the packer. Cam-Lok is the industry's best insurance against failure of a packer to release.

*and it's simple to operate . . .*

Cam-Lok is a tough, compact, full-opening, retrievable, reliable tool. In its simplest application, Cam-Lok is used as a weight set packer. Cam-Lok is set in tension to take advantage of pressure from below when testing, water flooding, fracturing, acidizing, or in shallow wells where the tubing weight and casing fluid column may not be sufficient to hold the packer weight-set against high bottom hole pressure.

Call the nearest Brown representative for full details and pack more profit in your next completion with the versatile, thrifty, positive Brown Cam-Lok Packer.

**BROWN**
**OIL TOOLS, INC.**
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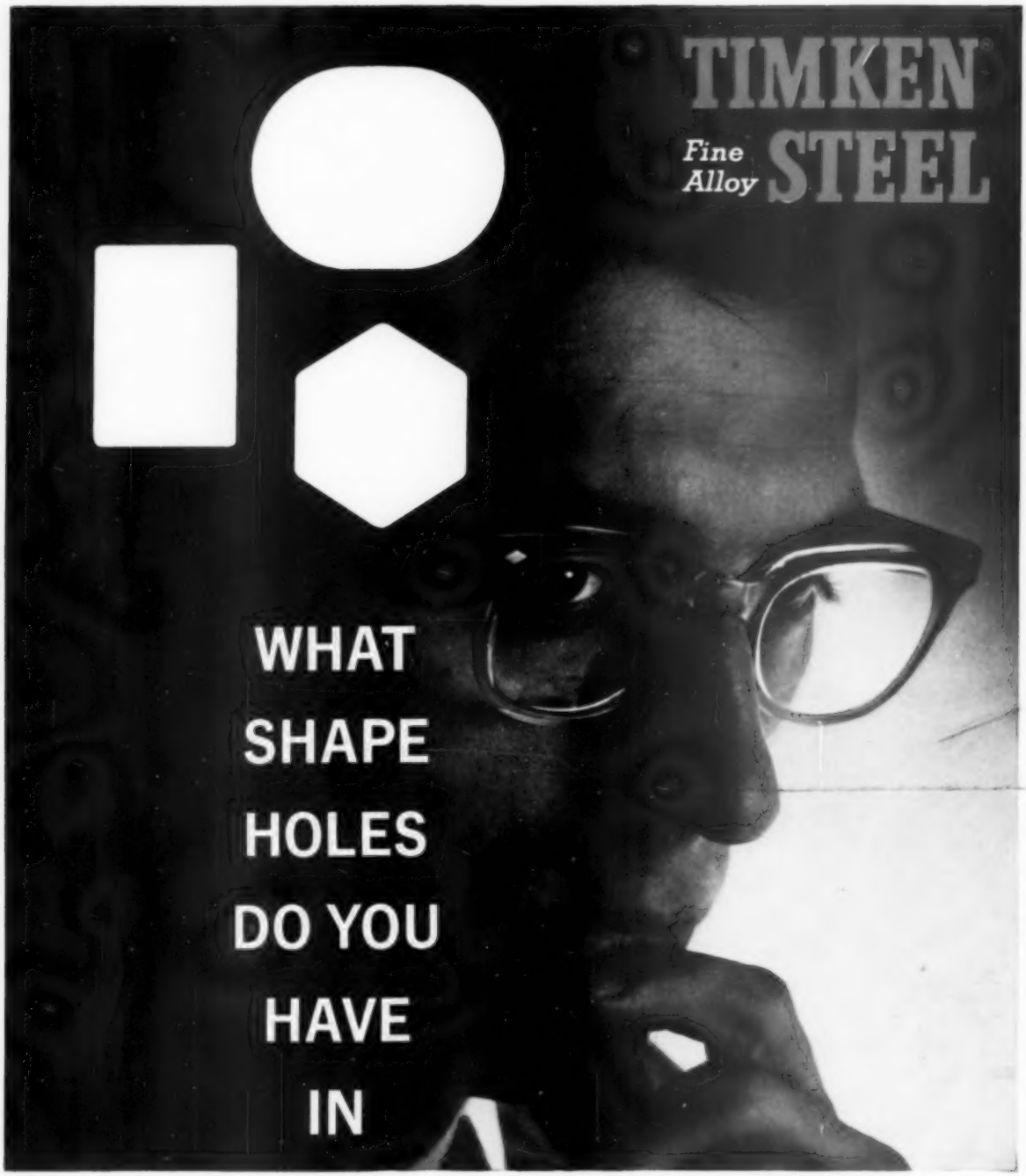
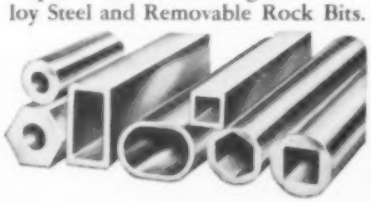



No matter. Whether you need a round hole, a square hole or a hex hole for the hollow parts you manufacture, you can eliminate costly machining operations. Start with Timken® seamless steel mechanical tubing and your first step will be finish grinding.

With a special cold working operation, the Timken Company can supply you a variety of shapes and sizes of high quality alloy steel in all common analyses. You get extra strength from the forged quality and spiral grain flow of rotary pierced tubing. And because we target the process to *your* end use, you're assured superior quality and uniformity in your products.

For more information on how Timken seamless steel tubing can save you time and money in all your hollow parts, write: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.